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ASSESSMENT

WORKING GROUP

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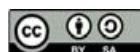
**THE INTERNATIONAL SCIENCE AND
EVIDENCE BASED EDUCATION ASSESSMENT**

**Education
2030** 



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REIMAGINING EDUCATION: THE INTERNATIONAL SCIENCE AND EVIDENCE BASED EDUCATION ASSESSMENT

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THE INTERNATIONAL SCIENCE AND EVIDENCE BASED EDUCATION (ISEE) ASSESSMENT: WHY IS IT NECESSARY?

Education matters for people at all stages of life. But what is the purpose of education? This quintessential question must be asked before we can assess if our education systems are delivering on their promise. Should the goal of education be to develop human flourishing, or should it be to meet the demands of ‘homo economicus’?

The way the future evolves very much depends on education. Today’s mindsets on how we live, the economic and political systems we adopt, the formal and informal

rules and regulations – the governance – that societies adopt, the way we perceive environmental and social problems are all very much influenced by the type (or lack) of education provided by past and present generations. The speed at which the world is changing, especially driven by technological progress and in transitioning from an industrial to a knowledge society, suggests that education can never be static and that the discourse on education, as Dewey in 1923 asserted, ‘should never come to an end’. It should be continuously evolving in response to the needs of society and the planet.

Therefore, now is the time to take stock and look ahead. A starting point is to ask two fundamental questions.

1. Are education systems serving the right purpose?

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2. Are they equipped to address the pressing challenges we face today?

To answer these questions, a systematic assessment of the existing knowledge on education and learning is urgently needed. An assessment grounded in science¹ and evidence drawn from a multitude of disciplines, encompassing the entire complexity of learning and education, should consider the following:

- the goals of current education systems and their relevance to today's societal needs;
- the broad socio-political contexts in which education is embedded; and
- the state of the art for learning processes drawing from the sciences of learning.

While other reviews and reports have addressed pieces of this complex education ecosystem, a transdisciplinary approach drawing on science and evidence is urgently needed to understand the multifaceted complex education systems across the globe. The International Science and Evidence based Education (ISEE) Assessment is the first to use an integrated conceptual framework that requires the separate streams of knowledge to be integrated to answer the two overarching questions above.

Science and evidence are now widely accepted as a necessary condition for most policy-making. The success of the Intergovernmental Panel on Climate Change (IPCC) in influencing policy by bringing the best science and evidence to the table has been instrumental in shaping climate change policy. However, the road has not been smooth, with many

¹We define science as the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence (The Science Council, <https://sciencecouncil.org/about-science/our-definition-of-science/>).



critics questioning the validity of the science and the evidence provided. The same can be said of the Millennium Ecosystem Assessment, which brought to the fore the power of multidisciplinary science and evidence in informing policy-making for the sustainable use of biodiversity and ecosystem services for the well-being of humanity.

The field of education is no different. However, unlike in the environmental field, no previous attempts have been made to undertake an integrated transdisciplinary international assessment of science and evidence in the field of education. Education policy has been widely influenced by anecdotal information and is seldom backed up by transdisciplinary consensus science and evidence. However, our knowledge of learning processes and their bidirectional relationship with their contexts is rapidly increasing due to advancements in all disciplines addressing educational issues, and particularly over the past two decades by research from the field

of mind, brain and education. But the exchange of knowledge and information across the various disciplines working on education is challenging, as is the translation of new findings from this transdisciplinary research into educational policy.

Recognizing the need for, but absence of, a transdisciplinary approach to education and the limited use of science and evidence in education policy-making further strengthens the need for the ISEE Assessment. The term ‘assessment’ here refers to a critical evaluation of the state of existing knowledge on education and learning by a team of independent experts drawn from a broad range of relevant disciplines and from across the world. The knowledge base is peer-reviewed scientific literature, but also includes credible grey literature. The Assessment report consists of 25 chapters, which have undergone a blind peer-review process. It assesses findings from across disciplines through deliberative discussions amongst the team of diverse

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experts throughout the project. The accompanying Summary for Decision-Makers (SDM) addresses overarching key questions and translates the answers into policy-relevant recommendations.

In addition, the Assessment highlights gaps in knowledge and suggests potential future research agendas. To be clear, the ISEE Assessment is of a very different nature from international large-scale student assessments, such as the Programme for International Student Assessment (PISA). Assessments like the one we present here have proved extremely fruitful in other domains (e.g. IPCC) to synthesize information available from a wide range of disciplines. This has never before been performed for education.

THE ISEE ASSESSMENT CONCEPTUAL FRAMEWORK AND STRUCTURE

The ISEE Assessment launched in September 2019 with an

expert meeting hosted by the Chief Scientist's Office, Quebec, Montreal and included approximately 20 scientists from around the world. Expertise was drawn from a range of education-related disciplines, such as international comparative education, human developmental and education psychology, neuroscience, cognitive science, economy and philosophy. This group gathered over three days to deliberate if an assessment of education would be beneficial, what it could contribute to education and what should be the conceptual framework. Although there were many disagreements among the experts, two common findings emerged: the need for an assessment of this nature; and the need for a transdisciplinary, multicultural and multiperspective lens to rethink the education agenda for the twenty-first century.

Developing a conceptual framework is an essential first step when undertaking an assessment of this nature. The

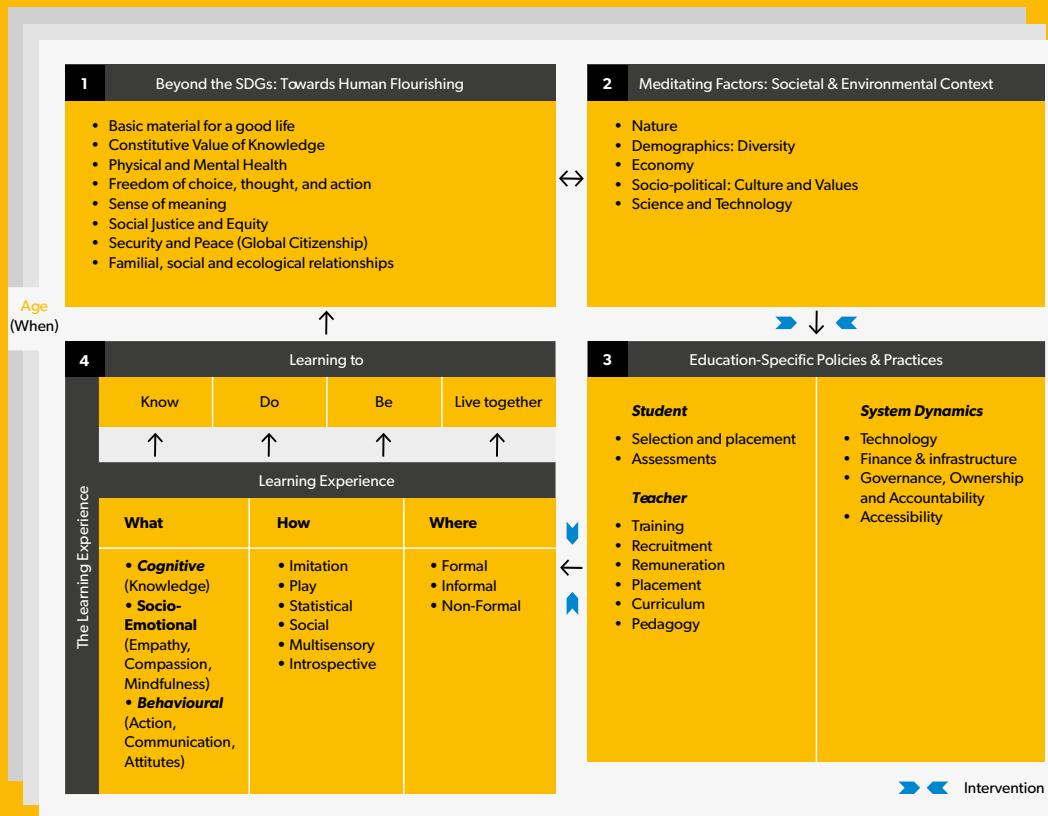


Figure 1. The ISEE Assessment Conceptual Framework of lifelong learning

ISEE Assessment Conceptual Framework (CF) aims to capture the key interlinkages between critical components of the education and learning system as understood by the education community represented by the group of experts convened at the first expert workshop. The CF presented above provides the basis for understanding and unpacking the complexity of the knowledge on education and learning across the world.

WORKING GROUP 1: EDUCATION AND HUMAN FLOURISHING

Working Group 1 on human flourishing unpacks Box 1 and explores the interdependency between Boxes 1 and 4 in the CF. Chapter 1 provides an overview of the working group and the rationale for the chapters presented in the volume. Chapter 1 also evaluates the concept of human flourishing and explores whether a definition can be

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used in education systems that allows context-sensitivity but still offers a common set of parameters. A main finding is that any education system for the future must acknowledge that volatility, uncertainty, complexity and ambiguity are central characteristics of our world, and education systems must rise to meet these challenges. **Chapter 2** reports that since the Second World War, educational policy and, in particular, education's role in human development has advanced along two parallel tracks with the dominant pathway focusing on the economy, while the other track, which takes a broader humanistic view emphasizing non-economic and non-instrumental objectives for human flourishing, is relegated. **Chapter 3** presents recent advances in cognitive and affective science that demonstrate the skills associated with flourishing can be cultivated through education, in the same way as literacy and numeracy. The chapter also outlines that about 82 per cent of teachers in teacher surveys consider there is a

disproportionate focus on exams in education in contrast to the well-being of students. A similar observation emerged with 73 per cent of parents preferring to send their children to a school where they would be happy even if their exam results were not as good as those achieved in high-stress exam oriented schools. Most students (81 per cent) indicated they wanted to learn more about how to look after their mental well-being.

Chapter 4 presents some perspectives and suggestions on curriculum, assessment and teaching reforms towards an education for flourishing following six curricular domains and six learning trajectories: learning to know and think, learning to do and evaluate, learning to learn, learning to live together, learning to live with nature and learning to be and become. This chapter recommends a slight adaptation of UNESCO's four pillars of education by introducing two additional pillars to equip education systems to better address today's societal and environmental



challenges. Chapter 5 completes the work of this working group by providing recommendations for strengthening schools towards an education for flourishing based on an assessment of existing school practices and environments.

WORKING GROUP 2: EDUCATION AND CONTEXT

Working Group 2 on contexts aims to understand how our social, economic and political systems influence, and are influenced by, our education systems (**the interdependent link between Box 2 and Box 3 in the CF**). Furthermore, it examines how these contextual factors relate to diverse conceptions of the purpose of education (**the interdependent link between Box 1 and Box 2**). The first four chapters look at the macro level: the social, political, economic and environmental contextual factors the group considers as having a critical influence in the design of education systems across the globe. The group looked at the political economy of education, as well as how global social phenomena such

as colonialism and more recently climate change and sustainability issues have influenced education systems. These chapters look at how equitable education systems have been over the past fifty years and develop interesting insights into how meritocracy – frequently touted today as the great equalizer – actually threatens the equity and sustainability of education systems, fuelling acute competitive intensity and narrowing the experience of learning for millions. The concept of ‘hereditary meritocracy’ is shown to be a rising trend among Ivy League educational institutions in the United States, where the majority of the students are from the top 1 per cent of the income distribution while a minority come from households in the bottom 60 per cent. In addition, the chapter informs how socio-economic disparities affect the learning of the over 1 billion children who are impacted by poverty.

Chapter 2 on environmental contexts highlights the limitations

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of approaches to ‘education for sustainable development’, given that education remains wedded to a fundamentally human capital oriented vision looking at nature purely from an instrumentalist view rather than as an existential and intrinsic element of human flourishing. An important dimension in today’s education systems is the notion of conflict and its implications for education. **Chapter 5** reports that the psychological impact of conflict (and related, trauma and poverty) on learning is huge and that, as far as possible, education systems must recognize and accommodate these impacts when designing curriculum, assessments and teacher training. Approximately 37 per cent of primary school aged refugee children are out of school, while only 24 per cent have access to secondary education and a dismal 3 per cent to higher education. Both **Chapters 5 and 8** (on curriculum) stress the role that education can and often does play in causing conflict, through fostering intolerance, xenophobia and societal division.

Chapters 6 and 7 of Working Group 2 then address the nature and extent of recent advances in neuroscience and technology as these relate to education, assessing how developments in these fields have both influenced, and have been influenced by, contextual factors (political, commercial, cultural, etc.). The final set of three chapters assesses how contexts have shaped, and are shaped by, key institutional features of our education systems that include curriculum and pedagogy (**Chapter 8**), assessment (**Chapter 9**) and the teaching profession (**Chapter 10**). These chapters elaborate how curriculum, assessment and teacher training are influenced by the political, social and economic climate in which education systems are embedded. Taken as a whole, the analysis presented in **Working Group 2**, while underlining the crucial importance of education in today’s world, also reminds us of education’s darker aspects (e.g. its potential to fuel conflict, as well as ameliorate it) and of its limitations as a resource for solving the world’s problems if the contextual factors are



not aligned towards peace and sustainability. A key conclusion is the need to balance hope in education's transformative potential with awareness that fully realizing its capacity to promote human flourishing requires far-reaching changes in our political and socio-economic order.

WORKING GROUP 3: EDUCATION AND THE LEARNING EXPERIENCE

Working Group 3 on the learning experience assesses the relationship between the 'what', 'how', 'where' and 'when' of learning, and how they relate to UNESCO's pillars of education, in light of state-of-the-art evidence from the science of learning, and studies of the socio-economic, environmental and other challenges we face today (**the interdependent links between Box 4 with Boxes 3 and 1 in the CF**). Building on the definition of education and learning as a 'relational' process (**Working Group 1**) and insights from brain imaging studies, the role of social and emotional learning (SEL) is incorporated into all four aspects of learning. **Chapter 4** on social and

emotional foundations of learning highlights that the learning experience at the individual level is intrinsically cognitive, emotional and social, as there is no clear dissociation between cognitive and emotional functions of the brain; rather learning occurs from the interconnectedness of neural networks across many functions. The chapter reports that although SEL improves learning outcomes by 7 to 11 per cent, it only constitutes about 7 and 4 per cent of learning in primary and secondary education respectively.

Chapter 2 on brain development and maturation highlights the non-linear nature of brain development and learning as a result of a lifelong dynamic and mutually interacting interplay between nature and nurture, contrary to the long-held belief in the competing forces between biology and culture. Although the themes of individual differences and learning differences overlap to some extent, experts from **Working Group 3** strongly felt that separate chapters on individual differences and learning differences and

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disabilities were needed. Therefore, **Chapter 3** provides new evidence demonstrating that individual differences in human development and learning arise from reciprocal interactions between biological, psychological and sociological factors. It calls for an integrated multidisciplinary approach to the study of human development, and its conceptualization in education. **Chapter 4** provides details of SEL, what it entails and offers to the learning experience. The chapter underscores the high returns to investment in SEL and its contribution to not only academic achievement but also to social issues such as bullying, substance abuse, aggression, and depression, among others. **Chapter 5** emphasizes the importance of building a strong foundation of academic skills, such as literacy and numeracy, to scaffold other skills and develop flourishing. This underscores the importance of the integration of SEL with the more traditional competencies of literacy and numeracy within education systems to reach for human flourishing, which we call the ‘whole-brain approach’.

The chapter also emphasizes the importance of mother tongue instruction in the first formative years before second languages are introduced to achieve the best possible learning outcomes while highlighting the findings of the **2016 UNESCO Global Monitoring Report** that about 40 per cent of the global population does not have access to instruction in the language they understand.

Chapter 6 raises important questions relating to inclusive education versus special needs education and presents findings suggesting that care should be taken when designing inclusive education policies. Emphasizing that one in every five to ten children expresses some form of learning difference such as dyslexia or dyscalculia, it highlights that particular attention should be given to disabilities that are invisible but significantly affect learning. About 40 per cent of countries do not collect data on prevalence, school attendance and school completion for students with disabilities/differences, limiting informed and effective



policy-making to close gaps in access and learning under the inclusive education umbrella. The call for universal, preventive screening emerges as a clear policy recommendation, while also recognizing that careful implementation is essential.

Chapter 7 addresses ‘where we learn’ and explores how built spaces, natural spaces and digital spaces affect learning. It looks at the roles of these different kinds of spaces for learning, attainment, interpersonal relationships, skills development, well-being and behaviours across UNESCO’s four pillars of education. The chapter also explores how learning spaces can be actively shaped, felt and understood through practices and policies that occur within and around them.

WORKING GROUP 4: EDUCATION - DATA AND EVIDENCE

The ISEE Assessment was initiated with the idea of using science and evidence as its founding pillars. However, we soon noticed that the terms evidence and data

prompted a slew of questions and clarifications that we did not anticipate. Recognizing the diversity of views and perspectives of what a science and evidence based assessment means, a small group of experts was commissioned to provide more clarity and guidance on what evidence means and how data can and should be used in education practice and policy-making. This working group’s focus is on seeking the best way to provide answers to the questions: what worked?; what is working best generally?; and will a given intervention work here and now? A new taxonomy of eight tiers or levels of evidence guides matching available evidence to these questions and assess the strength of this evidence. The experts in this group provide a deeper understanding of how effect size and consistency of effect sizes influence learning outcomes, and how they can – and cannot – be used in practice and policy guidance. They also illustrate the potential of this modern approach to evidence based education by discussing the EEF (Education

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Endowment Fund) Evidence Database, effectively providing a proof of concept regarding some of the key ideas put forward as the new norm.

Working Group 4, in particular **Chapter 3**, highlights the importance of understanding and interpreting uncertainty. The concepts of p-values and statistical significance, together with confidence intervals, are explained and recommended as the new standard practice to be used when presenting empirical evidence in support of practice and policy-making. The core finding from **Working Group 4** is that science and evidence based education practice and decision-making are evolving into a more complex set of questions, but are potentially very fruitful undertakings, for which it is key to understand the limitations of extant data and evidence in striving to create, obtain and use recent evidence. A clear and transparent discourse surrounding the assumptions and caveats in the analysis should always be provided so that practitioners and decision-

makers are aware of limitations and uncertainties.

GOVERNANCE AND SOCIAL PROCESS OF THE ISEE ASSESSMENT

The ISEE Assessment is a first of its kind for the field of education. Most studies reviewing education and learning primarily take a single disciplinary lens with very little collaboration, especially across traditional educational study disciplines and the newer science of learning disciplines. A key component for a successful endeavour of this nature is mutual respect and acceptance of multiple perspectives and a culture of ‘agree to disagree’. In addition, an open culture is needed in which experts keep an open mind, truly listen to others and are fearless in asking questions to ensure transparency in assumptions and terminology. Finally, there must be a process in place to facilitate consensus building across all experts in order to create a synthesis of findings to be used by policy-



makers. Achieving the above will strengthen education systems and facilitate learning for the benefit of the individual and society.

An Advisory Board guided by two co-chairs was formed, comprising eminent persons from academia, business and policy, to provide support and guidance to the Assessment. The primary function was to ensure the relevance and credibility of the Assessment exercise. The overall scientific work of the Assessment was guided by the two Assessment co-chairs, one from the social sciences and the other from the natural sciences. The primary responsibility of the Assessment co-chairs was to ensure smooth collaboration across the various disciplines within and across working groups and to ensure the strictest scientific rigour was applied to the Assessment exercise. The co-chairs also were responsible for synthesizing the Assessment findings in the SDM document and a shorter headliners document that conveys the key messages and policy recommendations from the ISEE Assessment.

Each working group had two senior co-chairs supported by a junior co-chair, always combining experts from traditional educational studies and the sciences of learning community. Recruitment for these positions was a non-trivial process. Many early invitations were politely rejected because the work was outside those individuals' comfort zones, as well as requiring them to find common ground and come to shared consensual conclusions with experts and scientists outside their own communities and bubbles. This in itself was an important finding as a new social contract for education is designed and implemented by member countries in response to UNESCO's Futures of Education report released in November 2021.

Once the group leaders were identified, the arduous process of identifying the authors and structure of the chapters for the various working groups took place. The tendency to identify familiar faces and colleagues was only natural and therefore stringent requirements for each chapter

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to ideally have at the minimum two disciplines represented were established, alongside the strong recommendation to reach a representative author team in terms of geographic location and gender. However, the process was not always perfect and sometimes a chapter has leaned further towards a particular discipline or perspective than we ideally would have liked.

In order to minimize disciplinary bias but also to ensure scientific credibility, a blind peer-review process was put in place. Review editors, again from different disciplines, were identified to oversee the review process to ensure legitimacy, credibility and the optimal selection of the most appropriate reviewers for each of the chapters across all four working groups. The secretariat overseeing the logistics of the assessment was responsible for compiling the review comments and supporting the review editors to ensure all comments were adequately addressed by the respective chapter authors before they were approved for publication.

THE OUTPUTS

The results of the ISEE Assessment are presented in four volumes, each presenting the findings from each of the four working groups. As mentioned earlier, three working groups present state-of-the-art knowledge on education and learning based on the CF developed for the ISEE Assessment, and one on the meaning and use of data and evidence. Needless to say, there are many interlinkages across these working groups and attempts have been made to insert cross-references where necessary.

The SDM is an essential output from the ISEE Assessment. The SDM is presented not as a summary of each working group, but as a synthesis across all the working groups. The SDM is structured along five key questions of relevance for policy-makers. This involved ‘harvesting’ the answers to each question from all four volumes and presenting them in an integrated fashion that reflects the complexity and



interconnectedness among the various components within the education sector. The SDM presents the overarching key messages, findings and recommendations that emerge from the full ISEE Assessment report.

A headliners document forms part of the overall package, providing a brief overview and reflecting the key take-home messages and policy recommendations. It is meant to offer a snapshot of the ISEE Assessment and is a quick reference primarily for decision-makers and policy-makers.

CONCLUDING REMARKS

The ISEE Assessment is a first for the education sector. It brings together a critical mass of experts and scientists working in the field of education. The process of bringing together over 300 experts and scientists from a range of disciplines has been a challenging task but offers an

exciting learning experience of transdisciplinary collaboration within education. The two-and-a-half year journey produced new insights but, more importantly, provides the basis for future such assessments. The assessment process and the findings suggest that transdisciplinary research and collaboration is a necessary condition for any education policy-making, especially at the global level. The insights emerging when a range of disciplines combine their relevant research and perspectives are invaluable, offering understandings that sometimes contradict conventional intuitions. It is also important to emphasize the process of consensus building among experts coming from multiple disciplines on findings which might be controversial or uncertain.

This first assessment highlights the richness of evidence and data on learning and education systems, but it also demonstrates how fragmented and compartmentalized these are across the world. Another key observation from the Assessment

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is that many of the experts and scientists were uncomfortable assigning confidence levels to the findings and the subsequent recommendations. This will need attention if we are to ground the science of learning into education policy-making. An international science organization representing multiple disciplines with a mandate on education should ideally carry out an assessment like the ISEE Assessment periodically in the future.

In 2021 UNESCO called for a new social contract in ‘Reimagining Our Futures together: A New Social Contract for Education’. We are optimistic that the take-home messages, key findings and policy recommendations put forward by the ISEE Assessment will

guide countries across the globe when designing the blueprint for this new social contract. An education for human flourishing using a whole-brain, learner-centric approach acknowledges the interconnectedness between cognitive, social and emotional dimensions, and how these are influenced heavily by societal and contextual factors. Furthermore, recognizing and understanding the vast individual differences in development and learning is key when designing any social contract on education in any part of the world.



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WORKING
GROUP

O2

EDUCATION & *Context*



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Ch1

Beyond education: context, end goals and limits

Ch2

Global change and the contextual dynamics shaping education: a view from the sustainability- education nexus

Ch3

Political economy of education: implications for efficiency, equity and social justice

Ch4

Diversity and social justice in education

Ch5

From perpetrator to peacebuilder: rethinking education in conflict- affected societies

Ch6

Education technology

Ch7

Contexts of educational neuroscience

Ch8

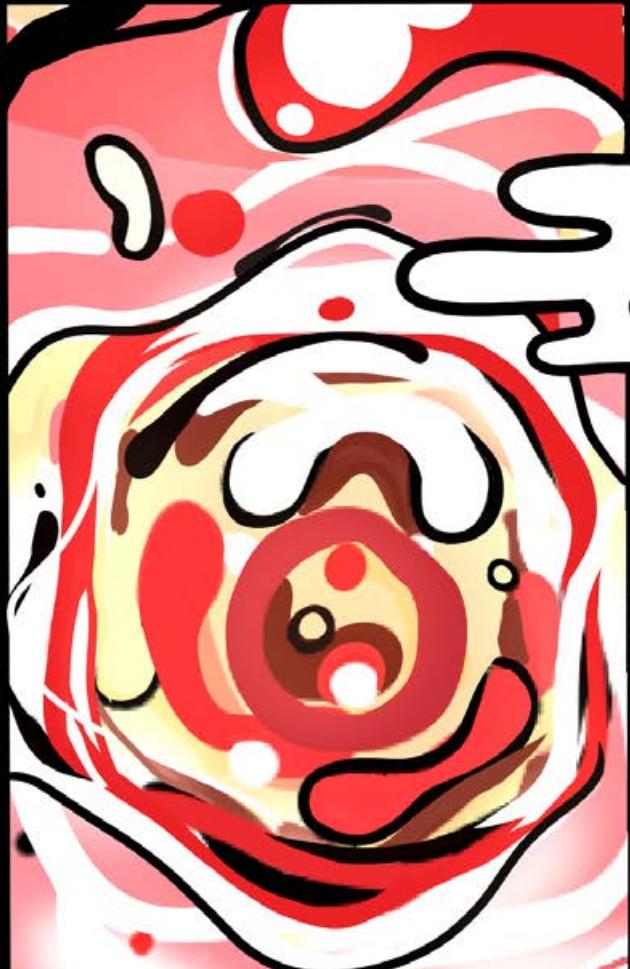
Curriculum and pedagogy in a changing world

Ch9

Assessment in context

Ch10

The teaching profession in context: issues for policy and practice around the world



WORKING
GROUP 02

02

EDUCATION & *Context*

Working Group 2 explores the complex manner in which context (ecological, political, cultural, social and economic) shapes, and is shaped by, diverse understandings of what it means to lead a fulfilling life, and the role of education in achieving this.



C H A P T E R



Beyond education: Contexts, end goals and limits

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This chapter introduces Working Group 2 (WG2) of the International Science and Evidence based Education Assessment. Building upon (WG1), which highlights the importance of mobilizing education to support human flourishing, WG2 emphasizes the complex ways in which diverse contexts (ecological, political, cultural, social and economic) shape, and are shaped by, diverse understandings of what it means to lead a fulfilling life, and of education's role in this. We begin by explaining our approach, acknowledging both the challenges and importance of analysing context from a multidisciplinary perspective. After summarizing the overall content of WG2, we discuss themes that are especially urgent, in particular the role of politics and ideology in shaping (or distorting) educational priorities. We challenge the tendency in much contemporary discourse to hail education as a silver bullet for society's ills and argue that realizing an educational vision consistent with true human flourishing requires understanding the limitations of education to solve the problems that confront us. Recognition of the enormous transformative potential of education is at the heart of our vision, but rather than expecting education alone to transform our societies, we need to commit to action to alter our social and political contexts so as to enable education systems to refocus on the intrinsic value of learning.

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1.1

Introduction

As we write these words, a devastating pandemic continues to rage around the world, disrupting or extinguishing lives. Scientists see this outbreak as one consequence of unrelenting human pressure on the natural environment, as we subject our

planet to unprecedented heating, and encroach upon and degrade the habitats of the species with which we share it (**WG2-ch2**). Thus, the overarching context in which educators operate today inescapably confronts them and their students with threats not



What do we talk about when we talk about context, and, given the interdisciplinary nature of this report, to what extent are we all talking about the same thing?

just to the quality of human life, but to life itself. As United Nations (UN) agencies have acknowledged, it is a context that requires us urgently to foster the determination and capacity to challenge an environmentally destructive, economically rapacious and politically fractious status quo (**UNESCO, 2014**). Citing the perils of climate crisis and poverty, in 2014 the UN called sweepingly, if vaguely, for ‘transformative’ change in social and economic policy, and ‘in our relationship with our one and only planet’ (**UN, 2014**). The same year, adumbrating its vision of Education for Sustainable Development (ESD), UNESCO emphasized that ‘to create a world that is more just, peaceful and sustainable, all individuals and societies must be equipped and empowered by knowledge, skills and values as well as be instilled with a heightened awareness to drive such change’ (**UNESCO, 2014**).

Of continued relevance, therefore, is a central question posed by UNESCO’s 1996 Delors Report: What kind of education is

needed for what kind of society in the future? Taking account of debates over fundamental aims of education and learning (e.g. as expressed in the ‘pillars of learning’ outlined in the Delors Report (**International Commission on Education for the Twenty-first Century, 1996**), the chapters in this section of the current report analyse how a range of contextual factors (political, social, cultural, institutional, environmental, technological, etc.) influence interpretation of the diverse goals of education, and the capacity of education systems to meet these goals. In this opening chapter, we begin by explaining the rationale for analysing context in a report on education. What do we talk about when we talk about context, and, given the interdisciplinary nature of this report, to what extent are we all talking about the same thing? Why must context be so central to our analysis? Following an attempt to answer these preliminary questions, we outline the logic behind the focus and sequencing of the subsequent chapters. This is followed by discussion of several key themes that run through these

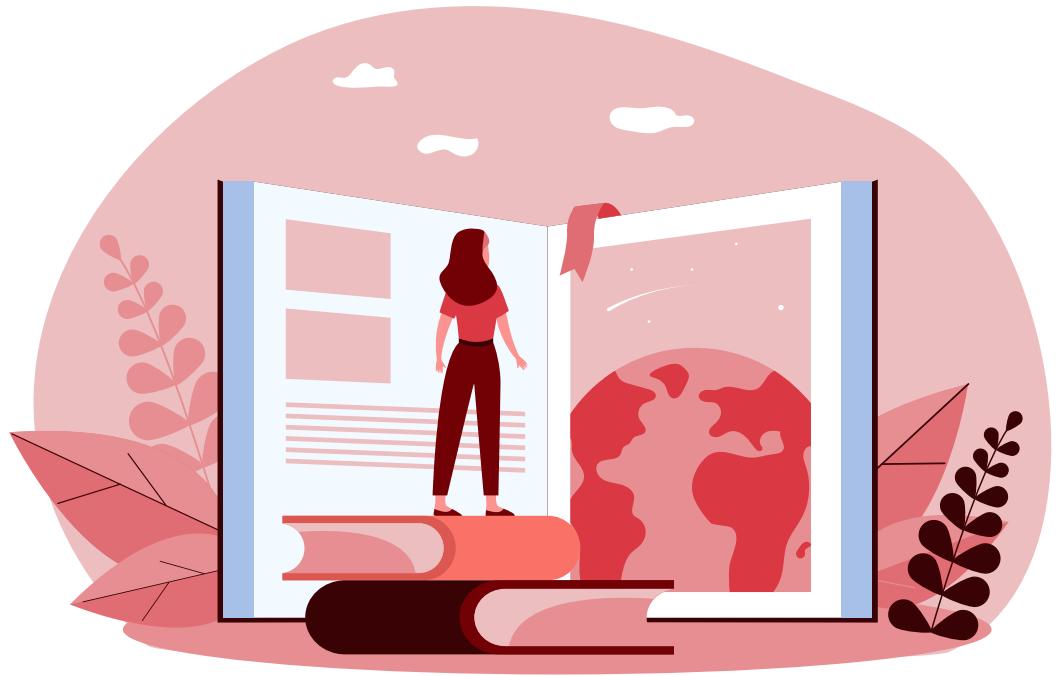
... a narrow focus on human welfare is not enough, when it is now abundantly clear that this cannot be considered in isolation from the broader fate of the planet.

chapters, notably the interwoven roles of politics, ideology, science and technology in shaping educational debate.

The task of contextualization also involves locating the current report within a tradition of UNESCO publications on education, among them the 2015 *Rethinking Education* report (**UNESCO, 2015**) and the *Delors Report (International Commission on Education for the Twenty-first Century, 1996)* in addition to earlier studies. Broadly speaking, UNESCO has stood for a humanistic vision of education, distinct from the more instrumentalist, human capital-oriented perspectives of the OECD or the World Bank. Where those institutions have focused primarily on education's contribution to economic growth, UNESCO has sought to articulate a more expansive vision of human flourishing. It has also increasingly acknowledged that a narrow focus on human welfare is not enough, when it is now abundantly clear that this cannot be considered in isolation from the broader fate of the planet (**UNESCO, 2014**). Our

analysis (**especially in WG2-ch2 and WG2-ch8**) endorses this planetary outlook, while highlighting the risks involved in burdening education with the role of panacea for our social or ecological problems.

We therefore conclude this introductory chapter by discussing both the potential and the limitations of education as a means of solving the many problems confronting our world. Indeed, education is by no means necessarily or intrinsically beneficial, but can exacerbate the dangers of nationalism, unsustainable consumption, injustice, exploitation and conflict (**WG2-ch5, ch8**). Striving for a humanistic vision of education is vital but is not, in and of itself, a magic formula for enacting a positive transformation of our world. Rather, our chances of realizing such a vision depend largely on the extent to which we are able to create socio-economic and political contexts in which education-as-human-flourishing can thrive.



1.2

Why Context?

Why is an analysis of ‘context’ – or ‘contexts’ – vital to a report concerned with the ways in which education can best contribute to human flourishing? While intuitively we can all endorse the goal of maximizing human flourishing through education, attention to context serves to remind readers that attempting to apply uniform blueprints is unwise and potentially dangerous. Policy-makers, educators and the public at large need to understand that

efforts to improve or transform education must give due regard to the diversity and complexity of human societies and cultures if they are to do more good than harm.

Our starting point is that the relationship between science, education and learning is more complicated than is often assumed. There is an inherent tension between the focus of **WG2** on context – complicating overly

... sociology of education should engage with bioscience to interrogate the folding together of the social, cultural, biographical, pedagogic, political, affective, neurological, and biological in the interactive production of students and

simplistic narratives of how and why we learn – and the aspiration to provide clear educational policy recommendations to a global audience. This tension is manifested in the transdisciplinary nature of the team compiling this report, with different members bringing varied understandings of ‘context’ to the table. None of this means (as some social scientists have contended) that everything is ‘relative’ or that claims to truth are intrinsically ‘hegemonic’ (for more on this debate in relation to education) (see **Takayama, Srivakash and Connell, 2017; Vickers, 2020b**).

Rather, cultural and disciplinary differences throw important light on both the difficulties of transdisciplinary and international collaboration, and the reasons why it is vital to informed educational debate.

One set of challenges for such a transdisciplinary exercise involves the reluctance of many social scientists to acknowledge the value of insights from the biological sciences. Seeking to overcome the ‘split’ between biology and sociology, Youdell (2017, p. 1273)

argues that ‘sociology of education should engage with bioscience to interrogate the folding together of the social, cultural, biographical, pedagogic, political, affective, neurological, and biological in the interactive production of students and learning’. This involves recognizing the potential of what she terms a ‘biosocial approach’ that takes our biology as a crucial element of the ‘context’ relevant for an analysis of education and learning. At the same time, there is a need to ensure that efforts at ‘bridging’ between science, cognitive psychology and education avoids embedding ‘an assumed and enduring hierarchy across these disciplines’ that privileges ‘science’ and positions educational technology (EdTech) or neuroscience as ‘education’s saviour and corrective’ (Youdell et al., 2020, p. 884).

Another very different set of challenges for transdisciplinary collaboration arises from the tendency for some laboratory-based scientists or quantitatively minded social scientists to adopt a very narrow interpretation of



What constitutes evidence in any situation depends upon the nature of the questions asked, and those questions in turn reflect our ethical presuppositions and vested interests. What constitutes evidence in any situation depends upon the nature of the questions asked, and those questions in turn reflect our ethical presuppositions and vested interests.

context: as a set of factors that either facilitate or obstruct a given process or phenomenon. For example, what explains Finnish students' excellent literacy? Could it be teachers' status and conditions? Or the distribution of educational resources? Or some combination of measurable genetic and environmental factors? Factor analysis of particular educational phenomena is crucially important, if extraordinarily difficult. But there is far more than this to an analysis of 'context' and its relationship with education and learning.

Related to differing conceptions of context are differences over what constitutes 'evidence'. Those assuming that all analysis should deal in quantifiable factors equate evidence with ostensibly 'objective', measurable data. As Andreas Schleicher of the OECD said, 'Without data, you're just another person with an opinion' (*cited in Wilby, 2013*). However, most qualitative social scientists and historians operate under a broader conception of evidence, since many vital aspects of our social, cultural and political

life are not readily quantifiable. What constitutes evidence in any situation depends upon the nature of the questions asked, and those questions in turn reflect our ethical presuppositions and vested interests. The nature or rules of evidence also vary significantly by discipline. Evidence in psychological research is different from evidence in linguistics, or literary analysis, or in a courtroom. All use valid forms of evidence by their own epistemological lights, but the evidence may not be equally valid when one crosses disciplinary or epistemological boundaries. Restricting ourselves to questions that can be answered quantitatively risks embedding a disciplinary hierarchy, undercutting transdisciplinary collaboration and reinforcing a narrow and distorted vision of education (**WG2-ch9, WG2-ch4**).

A broader understanding of context appreciates that education systems, and learning within and beyond them, are fundamentally social phenomena. We all know this, or think we do. We recognize

that education is not just a matter of acquiring ‘skills’ of literacy and numeracy (important though this is), it is also about helping young people become responsible, engaged and fulfilled members of society. As **WG1** has set out, education needs to be understood as a fundamentally relational activity – not simply a process for maximizing individual ‘outcomes’ measured against objectives derived from overly standardized, externally determined frameworks.

But while most of us will endorse this statement of education’s socializing function, we too seldom pause to consider what this actually means. How does society shape our education systems, and how does education in turn shape society? How do politics, culture or vested interests condition how we think about education and its purposes in the first place? Given its embeddedness in hugely diverse social contexts, how far can we expect education to transform society? Or should we be thinking more in terms of changing society in order to transform education?

Delors asked ‘What kind of education is needed for what kind of society in the future?’ and affirmed that ‘choice of education means choice of society’.

While research may be able to provide evidence (of varying, diverse forms) that informs discussion and debate, answers at the level of policy and practice are likely to be highly complex and hotly contested. This is the nature of confronting complex, socially based issues that must of necessity play out over time in dynamically evolving environments.

Animated by its humanistic vision, UNESCO has traditionally been highly concerned with the social and cultural context for education. Despite its title, **Learning: The Treasure Within**, the Delors Report (**International Commission on Education for the Twenty-first Century, 1996**) places considerable emphasis on the external, social dimension of learning. Delors asked ‘What kind of education is needed for what kind of society in the future?’ and affirmed that ‘choice of education means choice of society’. UNESCO’s Futures of Education Commission (FEC), whose report has been compiled alongside this one (**UNESCO, 2021b**), similarly acknowledges the complex relationship between education and context:



When we ask what purposes education serves, we also need to consider whose interests it reflects. Who is in control, and how do their agendas shape (or warp) education?

Knowledge is linked inextricably to the cultural, social, environmental and institutional contexts in which it is created and reproduced. ... Learning is a multifaceted reality defined by the context. What knowledge is acquired and why, where and how it is used represent fundamental questions for the development of individuals and societies alike. (UNESCO, 2020, p. 16)

But when considering its relationship with our social, political or environmental context, we need to remember that education is not simply a toolbox of ‘solutions’, but also a Pandora’s Box of challenges. Too often, public debate reflects the naïve assumption that education is a store of remedies for social ills; that it is always intrinsically ‘a good thing’. But from the unsustainability of our economies, through the corrosive competitive intensity of our societies, to the fostering of intercommunal and international hatred, education is profoundly implicated in the dominant pathologies of our time – as **WG2-ch5** (on education and

conflict), **WG2-ch8** (on curriculum) and **WG2-ch9** (on assessment) emphasize.

That this is so should come as no surprise if we remind ourselves that education systems do not stand apart from or outside their social context, but embody and mirror it. As such, they reflect prevalent cultural and ethical assumptions regarding the ordering of society. More fundamentally, they are shaped by what Delors (**International Commission on Education for the Twenty-first Century, 1996**) called ‘the political factor’: the distribution of power amongst vested interests. When we ask what purposes education serves, we also need to consider whose interests it reflects. Who is in control, and how do their agendas shape (or warp) education?

For decades now, successive UNESCO reports have propounded an idealistic vision of education as a source of human liberation, fulfilment and empowerment (**Elfert, 2017**). But we seem as far away as ever from

The importance of ensuring greater cross-fertilization of neuroscientific, psychological and sociological work on education is underlined when we consider how naïve endorsement of ‘brain-based’ approaches to understanding education can lead us astray.

realizing this. The state of affairs in education and the world requires that we reflect upon and question our longstanding humanistic viewpoint: is it intrinsically unrealizable or impractical? Or is the current system perhaps too beholden to entrenched vested interests wedded to an alternative vision? And if so, can that alternative vision itself be reformed or transformed, or is it profoundly antithetical to these humanistic ideals?

In addressing these and related questions, authors from a wide range of backgrounds collaborate across our various chapters, ensuring a transdisciplinary conversation. This is important for those of all disciplinary backgrounds (and assumes no rigid dichotomy between ‘natural’ and ‘social’ scientists). At a time of rapid and, in many ways, unsettling technological change, it may be tempting for social scientists to resist calls to engage with new scientific developments that have their origins in somewhat distal, laboratory-based settings, rather

than emerging from educational settings. At the same time, there is a pressing need for laboratory-based scientists who study learning outside of typical educational settings like classrooms or schools to engage with research that looks at education as it occurs in these contexts. Many scientists are well aware of how their work can be misrepresented by boosters or naïve techno-optimists. However, most are less familiar with sociological or historical analyses that could inform strategies to counter the causes of this distortion. What is often lacking is sufficient awareness of how science itself is a social thing, conditioned, like any other human activity, by culture, politics and vested interests (**Gould, 1981**). There are signs of growing recognition within the ‘learning sciences’ (encompassing educational neuroscience (EN) and other disciplines) of this social dimension, with analysis of how the ‘learning brain’ interacts with the social context, yielding testable ideas about how to facilitate some aspects of learning (**Farah, 2018**).



If we are to transform education and society in a more sustainable and humane direction, scientists of multiple disciplines need to understand social, political and economic forces that may be antagonistic to such a transformation.

The importance of ensuring greater cross-fertilization of neuroscientific, psychological and sociological work on education is underlined when we consider how naïve endorsement of ‘brain-based’ approaches to understanding education can lead us astray. Writing in *The Lancet* in 2015, the eminent British neuroscientist Steven Rose alludes to the ‘billions’ that have been pumped into ‘solving the brain’ over recent decades. Asking ‘What has driven this vast expansion?’, he cites the wave of optimism stemming from mid-century biomedical advances (e.g. the discovery of DNA), but notes that inflated early hopes needed to be drastically dialled down: ‘the prospects for improved therapies for the worldwide wave of psychiatric distress seem as remote as ever’ (Rose, 2015). Unfortunately, in some countries, enhanced investment in neuroscientific and psychological research into education has come at the expense of investment in research examining its political, cultural and social dimensions – for reasons that are themselves more political than scientific

(Arai, 2016; Vickers, 2020a). If, as Youdell et al. (2020, p. 881) argue, ‘attending to social and biological entanglements has conceptual and practical potential’ in educational studies, then it is vital that respect for, and funding of, the social sciences and humanities (as applied to educational research and more broadly) is maintained alongside support for research of a more natural scientific bent.

If we are to transform education and society in a more sustainable and humane direction, scientists of multiple disciplines need to understand social, political and economic forces that may be antagonistic to such a transformation. This extends to greater awareness of the ways in which history, politics and culture shape our assumptions about what sort of transformation is desirable in the first place. Ambition and hope must be tempered by humility and caution – and an honest recognition of complexity.



1.3

Analysing education in context: the logic of our approach

Our assessment of the contemporary contexts for educational change proceeds through three stages. An initial group of four chapters considers macro-level social, political, economic and environmental forces operating at global and national levels. Beginning with a chapter that takes a planetary perspective, we examine the

educational implications of our current environmental crisis, and the state of the debate over ESD. We then move on to a consideration of the ‘political economy of education’, and to further chapters that deal with challenges posed by diversity (in various forms) and conflict. There follow chapters focusing, in turn, on technological change





and developments in EN, areas that have aroused much public attention in recent years, and in which considerable hopes for an educational ‘transformation’ have been invested. A final set of three chapters then brings the analysis closer to matters of immediate relevance for day-to-day teaching and learning, analysing how contexts shape, and are shaped by, key institutional features of our education systems: curriculum and pedagogy, assessment and the teaching profession.

1.3 .1

SOCIO-ECONOMIC, POLITICAL AND ENVIRONMENTAL CONTEXTS FOR EDUCATION

Chapter 2, following this introductory essay, examines key aspects of humanity’s relationship with the natural environment, the challenges of sustainability, and

their implications for education systems. Offering ‘a view from the sustainability–education nexus’, this chapter highlights the limitations of approaches to ESD that remain wedded to a fundamentally human capital-oriented vision. Arguing instead for the urgency of a more thorough going reappraisal of education’s links to employment and to dominant economic models, it points to the need to temper an overwhelmingly instrumentalist vision of learning with greater emphasis on education’s intrinsic value in enabling us to live fulfilling lives. A particular focus of this chapter concerns the epistemological foundations of our unsustainable relationship with the planet, which the authors relate to legacies of Western colonialism and their role in the origins of industrial modernity. At the same time, the chapter reminds us that critique of ‘coloniality’ and the epistemic underpinnings of industrial modernity should itself avoid the pitfall of Eurocentrism; authoritarianism, colonialism and ecological rapacity are blights that

... the manner in which education systems accommodate diversity, or fail to do so, must in turn be understood as a factor of political, cultural and socio-economic context.

transcend cultural or civilizational boundaries, in some degree implicating us all.

That discussion of issues of sustainability leads to an analysis, in **Chapter 3**, of the political economy of education. This reviews the state of debate over education's economic significance and costs, considering the implications of trends towards privatization and marketization of educational provision in many societies; the interaction of states, private corporations and multinational bodies (e.g. OECD and UNESCO) in the policy-making arena; and influential cultural and ideological beliefs concerning education's economic role. Of particular significance here are the related ideologies of meritocracy, neoliberal competition and assumptions (already critiqued in **Chapter 2**) concerning education's role in generating 'human capital' to fuel economic growth. These ideologies serve as a reminder of the powerful role that education plays in shaping dominant assumptions in the realms of politics and

economics, just as political and economic contexts in turn constrain and warp the potential of education. The chapter argues that, if we are to create space for more humane and sustainable approaches to education, a far-reaching challenge to powerful shibboleths such as neoliberalism is required.

Intimately related to questions of political economy is the role of education systems in distributing wealth and opportunity within societies, or legitimating certain patterns of distribution. **Chapter 4** therefore deals with issues of diversity and social justice as these pertain to education. These are issues that cannot be satisfactorily understood through quantitative methods alone: in all societies, cultural, religious, class and ethnic divisions (amongst others) influence the expectations different groups bring to education, and the ways in which they experience shared educational institutions. Therefore, the manner in which education systems accommodate diversity, or fail to do so, must in turn be understood



The pandemic of 2020–2021 has accentuated the urgent need to assess potential uses and abuses of this technology, and examine how political, commercial and sociocultural contexts have influenced public discussions of technology's role in education.

as a factor of political, cultural and socio-economic context. The understanding of ‘diversity’ here encompasses, in addition to dimensions such as gender, culture and class, the more novel dimension of ‘neurodiversity’, covering autism, dyslexia and other conditions related to diverse patterns of cognition.

When societies fail to accommodate diversity or deliver a modicum of social justice, violent conflict can follow. Conflict is a daily reality in many societies around the world today, while others recovering from recent trauma still struggle to cope with its aftermath. **Chapter 5** therefore explores the various dimensions and ramifications of conflict and its implications for education, combining consideration of the socio-economic, political, institutional and cultural aspects of conflict and post-conflict societies with reflection on its psychological impact and the challenges this poses for education.

1.3 .2

SCIENCE AND TECHNOLOGY AS CONTEXT

The macroscopic analysis of context offered in **WG2-chs2–5** is followed by an examination of issues that have assumed heightened importance in contemporary educational debate: the implications of technological change and the rise of EN. Even before the COVID-19 crisis began, debate was raging over the potential and risks of digital technology as a tool for teaching and learning. The pandemic of 2020–2021 has accentuated the urgent need to assess potential uses and abuses of this technology, and examine how political, commercial and sociocultural contexts have influenced public discussions of technology's role in education.

Chapter 6, on EdTech, reviews the implications for education

... EN has a potentially valuable role to play in informing educational practice and policy-making, but it is important to improve understanding of the nature and extent of that role, and its limitations.

of recent technological change, while arguing that the extent to which we see the potential of technology as ‘transformative’ for education depends on what we think education is for in the first place. Much of the ‘buzz’ around the educational potential of technology, and specifically of artificial intelligence, relates to hopes for the emergence of more individually ‘bespoke’ aids to learning. But while some of this potential may be real, the social effects of an ever more individuated approach to learning should give us pause for serious reflection. The chapter explores the tensions inherent in views of technology as a solution to educational problems identified by dominant actors, showing how such discourse often overlooks or suppresses technology’s potential to transform or disrupt the established order. In doing so, it critically examines issues of: access and equity; face-to-face (human, social, place-based) versus technology-mediated learning environments; teachers and teaching; and ethics. The authors conclude that the disseminators

of educational technologies, by and large, passively accept the educational status quo; are indifferent to the well-being and flourishing of learners and teachers (beyond securing the socioemotional stability necessary to improve narrowly defined learning ‘outcomes’); and are generally blind to the political and economic forces that shape our educational institutions.

Another area of science that has garnered increasing attention in public discussions of education over recent years is neuroscience.

Chapter 7, on EN in context, assesses neuroscience-based advances in our understanding of learning, and the extent to which these alter the terms in which key stakeholders ought to discuss education – issues discussed in greater depth in **WG 3** of this report (on ‘The learning experience’). The authors argue that the appeal of EN lies less in any revolutionary improvements to education it has so far yielded than in the future promise of such improvements. Methodological advances, notably in fMRI



(functional magnetic resonance imaging), raise interesting questions and enhance the popular appeal of neuroscience, although this is a technique that remains ‘in its infancy’ (Cobb, 2020, p. 320). The chapter further notes the attraction to many stakeholders of a widespread belief (disputed by many neuroscientists themselves) that education is all about adapting individual learners to a given social, political and economic context (see also Arai, 2016). In other words, claims relating to the educational potential of neuroscience have proven appealing to powerful constituencies in part because they seem profoundly unthreatening to the socio-political status quo. The authors conclude that EN has a potentially valuable role to play in informing educational practice and policy-making, but it is important to improve understanding of the nature and extent of that role, and its limitations. This must extend to an awareness of how the aura of scientific objectivity can be manipulated by those keen to avoid critical discussion

of complex and intractable contextual factors (relating to politics and culture, for example), in favour of a focus on effective delivery of a particular body of knowledge and skills regarded more or less as ‘given’.

1.3 .3

INSTITUTIONAL CONTEXT, PERSONNEL AND THE PARAMETERS OF EDUCATIONAL PRACTICE

The content of education is, however, far from ‘given’. While a field such as EN seeks to elucidate how we learn, of crucial importance are prior decisions regarding what we learn. In other words, what is the curriculum, who defines it, and what are the key contextual influences that shape curricular debate? These are fundamentally political and cultural questions, reflecting dominant ethical assumptions

...what is the curriculum, who defines it, and what are the key contextual influences that shape curricular debate?

... a vision of curriculum as a ‘complicated conversation’ that empowers diverse voices to challenge an authoritarian approach to the construction of knowledge through education.

that in turn derive authority from, or confer legitimacy upon, the distribution of power within particular societies. **Chapter 8**, on curriculum and pedagogy, thus foregrounds the crucial role of politics in shaping curriculum. The analysis here reminds us that education is by no means always or necessarily a ‘good thing’: where curricular control rests with forces intent simply on maintaining and legitimating their own power, irrespective of the consequences for ordinary citizens or the planet, then talk of sustainable or humane approaches to education is of little significance. This chapter adumbrates a vision of curriculum as a ‘complicated conversation’ that empowers diverse voices to challenge an authoritarian approach to the construction of knowledge through education. However, it also acknowledges that the potential to realize this vision depends largely on political conditions beyond the ambit of the education system itself.

Assessment is at once a key factor in shaping curriculum, and a key tool in the armoury of states

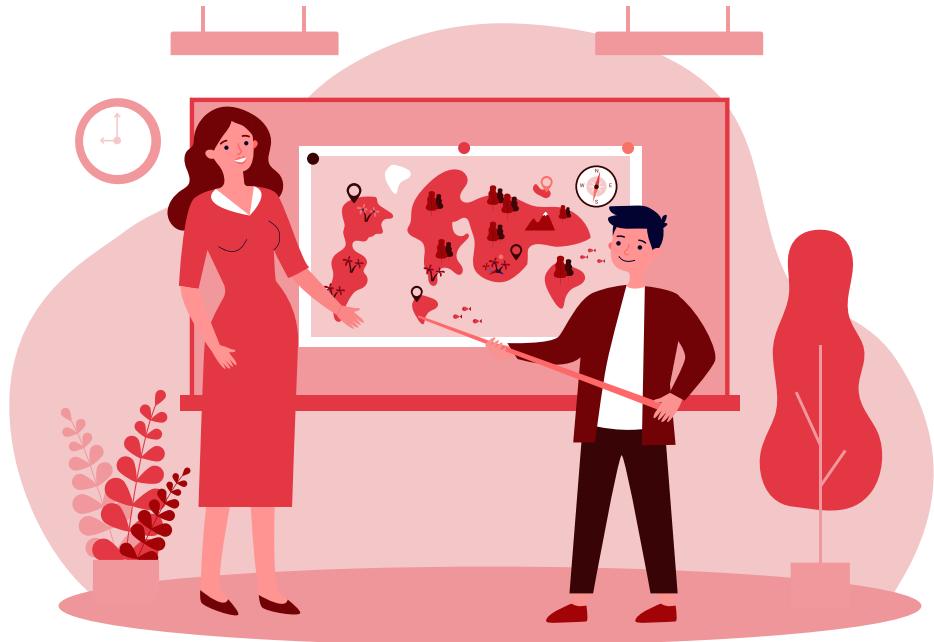
intent on extending surveillance and control over education systems. **Chapter 9**, on assessment in context, recognizes that assessment is a necessary feature of the learning process, but one that also carries the potential to narrow and distort radically the meaning of education. Assessment operates at various levels of education systems; it is directed at students, but also at teachers, schools and (increasingly) entire systems themselves. This chapter critically considers recent trends in international and national debates over assessment, and also reviews claims concerning the contribution of neuroscience or the ‘learning sciences’ to the refinement of assessment techniques. Of central concern for an analysis of assessment in context, however, are questions concerning what is assessed, why and how. Who controls decisions over assessment, which actors have sought to shape this debate, and with what ends in view? Amongst the issues considered here is the influence of transnational testing regimes (e.g. the OECD’s PISA tests) on global



education policy debate. Rather than focusing simply on ways of refining or improving assessment techniques, this chapter analyses factors influencing the choice of assessment methods, and what these tell us about the assumptions and objectives driving education systems.

Finally, as a bridge to (**WG3**) on the ‘learning experience’, **Chapter 10** deals with the key mediators or facilitators of student learning: teachers. But while **WG3** deals more extensively with technical aspects of the teacher’s role, here the focus falls primarily on the contextual influences shaping the teaching profession in the contemporary world. Indeed, the question arises as to how far we can talk of teaching as a ‘profession’ at all, when governments, corporate interests and other actors have in recent years

sought more intrusive oversight of the operation of schools and classrooms. How much autonomy and status do teachers enjoy in different societies, and what are the implications for teacher recruitment and retention, and for teaching itself? To what extent, and in what ways, has teaching become a ‘gendered’ profession (i.e. overwhelmingly female), why and with what implications? And with intensifying pressures for the deployment of EdTech within the classroom and beyond, what is the future of the human teacher in a traditional classroom? These are just some of the questions that this final chapter considers, as it examines the contextual factors that influence the capacity of teachers to enact a vision of education that enhances human flourishing, rather than reinforces an unsustainable and repressive socio-economic order.



1.4

Education and human flourishing: ideals, ideology and politics

The role that education should play in promoting ‘human flourishing’ is discussed in **WG1**, which integrates ethical or philosophical considerations with insights from the natural sciences. However, understanding the aims that animate education globally, and the difficulties of realizing a more humanistic approach,

also requires analysis of diverse contexts – historical, political, cultural, socio-economic and so forth. These dimensions of context receive varying emphasis across the **WG2** chapters: socio-economic issues, for example, come to the fore especially in **Chapter 3** on the political economy of education, while cultural considerations



Humanism can be defined in part through juxtaposition with its opposite: approaches that treat students or citizens merely as instruments for the fulfilment of external ends.

are more prominent in **Chapter 4** (on diversity) and **Chapter 8** (on curriculum and pedagogy). But central to our analysis is awareness of an aspect of context sometimes downplayed in international reports: the importance of politics and ideology in shaping education systems and debates surrounding them.

In ideological terms, UNESCO has always pinned its colours to the mast of ‘humanism’ (**Elfert, 2017**). Humanism can be defined in part through juxtaposition with its opposite: approaches that treat students or citizens merely as instruments for the fulfilment of external ends. Nationalism, capitalism, communism or religious fundamentalism have all been invoked to persuade ordinary citizens to sacrifice their autonomy and dignity in the pursuit of some imposed vision of ‘the greater good’ (**WG2-ch8**). The laws of the market, the destiny of the nation and even (chillingly) the supposed dictates of evolutionary biology have all been used to legitimate visions of education that prioritize the generation of productive ‘skills’

and unquestioning loyalty to the political status quo. The Chinese dissident Wei Jingsheng was rejecting such instrumentalism when he declared, ‘We want to be the masters of our own destiny. We do not want to serve as mere tools of dictators with personal ambitions for carrying out modernisation’ (**cited in Pantsov, 2015, p. 340**).

History reminds us of how states bent on pursuing ‘modernization’ or industrialization at the expense of more humane goals have frequently idolized science. In the politically fraught 1930s, the American sociologist Lewis Mumford (**1934, p. 367**) warned that ‘to perfect and extend the range of machines without perfecting and giving humane direction to the organs of social action and social control is to create dangerous tensions in the structure of society’. In other words, politics was vital to ensuring that technology was put to benign use. A terrifying alternative was sketched by Arendt (**2017, p. 453**), who portrays totalitarianism as ‘the last stage in a process during

If, as Sen (1999) argues, development is to be conceived as the enhancement of ‘freedom’, then education is instrumental to the enjoyment of all other ‘freedoms’ or ‘capabilities’ we have reason to value.

which “science has become an idol that will magically cure the evils of existence and transform the nature of man”. The advance of mechanized production threatened, she writes, to transform ‘all human activities ... into labouring’ (p. 624) with profoundly alienating and socially atomizing effects. Totalitarian movements have been able to exploit this alienation and isolation by channelling popular resentment through a strategy of ‘organised loneliness’ (p. 628).

None of this is to deny education’s important instrumental dimension, or the benign potential of science. The skills education imparts play a crucial role in preparing students for the labour market and for exercising the rights and duties of citizenship. Education is thus a means to various crucial ends, including the pursuit of economic prosperity as well as the ability to participate fully in the cultural, political and associational life of any modern society. If, as Sen (1999) argues, development is to be conceived as the enhancement of ‘freedom’,

then education is instrumental to the enjoyment of all other ‘freedoms’ or ‘capabilities’ we have reason to value.

However, in contemporary global debates over education, a narrow instrumentalism, often expressed in terms of ‘human capital’ or ‘human resources’, has predominated at the expense of attention to the intrinsic value of learning. This trend was accentuated following the collapse of communist regimes at the end of the Cold War, which was interpreted as confirming the deleterious consequences of generous public welfare and the virtues of unimpeded market forces. With economic globalization promising vast new investment opportunities, formerly socialist societies were thrown open to unregulated capitalism (Krastev and Holmes, 2020). East Asian societies, meanwhile, were touted as exemplars of a low-tax, small-state formula for equitable capitalism, underpinned by education’s role in securing a skilled and disciplined workforce (World Bank, 1990; Green et al.,



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2007; Vickers and Zeng, 2017). But neoliberal capitalism shares with the state socialism it has displaced a fundamentally instrumentalist vision of the citizen, focused overwhelmingly on the individual as a unit of productive capacity.

With organizations such as the World Bank and the OECD preaching the virtues of public spending restraint, and globalization pressuring governments to enhance 'tax competitiveness', education has been widely hailed as a painless panacea for all manner of social ills. 'Education, education, education!', enthused former British Prime Minister Tony Blair, as he sought to wean his Labour Party away from its tax-and-spend habits. China's post-socialist communist rulers, who depict 'welfarism' as a pathology of decadent Europeans (Vickers, 2022), have portrayed Chinese PISA results as evidence of their success in harnessing economic growth to educational efficiency, in a context of minimal welfare and intense competitiveness (Tucker, 2011).

More recently, mounting environmental anxiety has prompted the OECD to modify its emphasis on human capital generation. It now stresses the need to make students 'future-ready' by fostering their 'agency' (OECD, 2018, p. 4), so that they can 'reconcile tensions and dilemmas' and 'take responsibility' (p. 5). 'Students who are best prepared for the future are change agents' (OECD, 2018, p. 5). But how much of a shift does this represent? Ultimate 'responsibility' for achieving a sustainable and liveable future is implicitly transferred to the next generation (and their teachers), even though meaningful agency will be denied them unless action is taken now to transform our socio-economic and political status quo. Rhetoric of 'future-readiness' shores up the old 'human capital' model by placing it on an ideologically more defensible basis. The same is largely true of the global 'happiness industry' that promotes 'mindfulness', 'social-emotional' competencies and 'resilience' (Davies, 2016). By placing responsibility for change

Chronic socio-economic insecurity combined with an ideology of meritocracy transform life into what Markovits (2019), writing of America, calls a ‘massive, multistage meritocratic tournament’.

and adaptation squarely on the shoulders of individual learners, such discourses deflect attention from the urgent political and institutional changes needed to stave off catastrophe (**WG2-ch8**).

Education’s panacea status meanwhile justifies efforts to subject all aspects of the learning process to increasingly intense quantification and measurement. While appropriate assessment is crucial to supporting learning (**WG2-ch9**), demands for ever more elaborate ‘accountability’, reflecting the burden of expectation education now bears, tend to cramp and distort the curriculum (**WG2-ch8**). The ‘tyranny of metrics’ in turn imposes huge strains not only on learners, but also on teachers (**WG2-ch10**), whose autonomy, professionalism and morale are thus widely undermined. While autocratic states intent on mass surveillance lead the way (**Wan and Vickers, 2021**), the impetus for control through metrics is also strong under ‘high-stakes’ neoliberal regimes (**Bjork, 2015**). In both cases, access to ‘quality education’, minutely

calibrated and monitored, is represented as a sufficient guarantee of social justice.

But expecting education on its own to usher in utopia, while leaving structural inequities untouched, actually perpetuates inequality and injustice. Chronic socio-economic insecurity combined with an ideology of meritocracy transform life into what Markovits (2019), writing of America, calls a ‘massive, multistage meritocratic tournament’. Across East Asia, societies grapple with declining birth rates, largely because of the crippling burdens imposed by an even more extreme version of the same ‘tournament’. South Asian elites spurn public schooling, promoting a reliance on the private sector that minimizes their tax liabilities and maintains their privilege. In India, China, the United States (USA) and elsewhere, access to elite higher education reproduces extreme inequality, gilding it with a patina of meritocratic legitimacy (**Subramanian, 2021**). In the process, children themselves are





... society is fragmented, with the vast majority not only excluded from the opportunity to compete, but also denied moral grounds for challenging a yawning wealth gap justified by ‘merit’.

commodified and reduced to entrepreneurs of their own ‘human capital’ (**WG2-ch3**). Transmitting their ‘meritocratic inheritance’ transforms elite families into centres of production, subordinating children to ‘excessive and ruthless training’ that ‘crushes’ the ‘human spirit’ (**Markovits, 2019, p. 116**). Meanwhile, society is fragmented, with the vast majority not only excluded from the opportunity to compete, but also denied moral grounds for challenging a yawning wealth gap justified by ‘merit’ (**see also Sandel, 2020**). One consequence of such fragmentation is the heightened risk of domestic and international conflict (**WG2-ch5**).

As it contributes to escalating social inequality, alienation and discontent, spiralling meritocratic competition is also implicated in the global rise of populist nationalism. Immigrants, minorities and external foes are useful foils for elites seeking to distract from the structural and political causes of socio-economic dysfunction. By ramping up ‘patriotic education’,

and portraying depression, stress and alienation as problems of individual maladaptation rather than societal failure, vested interests seek to shore up an unjust and unsustainable status quo.

Education’s capacity to promote social mobility, thereby helping to heal social division and resentment, is crucial, but limited. On their own, pedagogical tinkering, or more sophisticated metrics, cannot solve these problems; if they come with intensified pressure for ‘accountability’, de-professionalizing and demoralizing teachers, they may even make the situation worse (**WG2-ch9, ch10**). Reducing educational debate to a discussion of ‘what works’, while ignoring the political, social and economic context, risks legitimating a narrow, depoliticized vision of learning that exacerbates injustice. Promoting the idea that education can painlessly solve our societal malaise has become a tactic for preventing, or deferring, critical debate over vital but politically intractable problems, involving

This dilemma discussed in *The Economist* (2021) on social mobility, cites cross-national comparative data demonstrating a strong correlation between high inequality and low social mobility.

taxation, welfare, labour rights and the impact of technological change.

This dilemma discussed in *The Economist* (2021) on social mobility, cites cross-national comparative data demonstrating a strong correlation between high inequality and low social mobility (*Corak, 2013*). The most equal societies are also the most mobile, on a spectrum ranging from expansive European welfare states at one end (Denmark, Sweden, Norway and Finland) to the USA at the other (only ‘developed’ societies were sampled). The contrast is especially stark with respect to child poverty, with the American rate almost triple that of Poland; the USA spends 0.6 per cent of GDP on family and child benefits, against an OCED average of 2.1 per cent and concludes is that the ‘American Dream’ needs salvaging through a major revamp of child support, and some wider enhancement of taxpayer-funded welfare spending. This arguably underestimates the challenges to a socio-economic model assuming a strong linkage between education,

employability and merit-based social mobility. Recent work on the implications of technological change for labour and work suggests a more fundamental rethink may be called for (*Susskind, 2020*).

By analysing the complex ways in which educational ideas, systems and practices are embedded in diverse contexts, the chapters in **WG2** thus lead us to ask whether we should actually be talking less about education transforming society, and more about society transforming education. To appreciate the importance of context is not to despair of the prospects for educational improvement. But it is to appreciate the limits of education’s capacity, on its own, to bring about desirable social transformation. If we truly believe in the intrinsic value of learning, we should first seek to create social conditions for experiencing education not just as a tool for securing material wealth or positional advantage, but as a central component of a fulfilling life.



BOX 1: EDUCATION, TECHNOLOGY AND SOCIAL JUSTICE: LESSONS FROM THE COVID-19 PANDEMIC

If we truly believe in the intrinsic value of learning, we should first seek to create social conditions for experiencing education not just as a tool for securing material wealth or positional advantage, but as a central component of a fulfilling life.

The COVID-19 pandemic has starkly dramatized some of the opportunities and challenges posed by technology for education. The benefits afforded by technology have been considerable. Online platforms such as Zoom have enabled classes to continue, in some form and for some learners, in hygienic safety. The ready availability of information and various learning tools via the internet has also enabled many to continue both learning and entertaining themselves in their own homes. These are benefits that few would seek to deny.

At the same time, they come with a social price we are only beginning to acknowledge.

Along with the potential for more individually tailored learning comes a diminution of the social dimension. Japan, noted for its emphasis on equality, uniformity and inculcation of a group-oriented ethos, was among the countries that lost the fewest days of face-to-face teaching to COVID-19 (24 days lost)¹ (Bjork, 2015; Tsuneyoshi et al., 2019). By contrast, England (61 days lost on average),² where governments have promoted ‘school choice’, differentiated learning and a more narrowly ‘skills’-oriented discourse, resorted to lengthy school closures, apparently on the assumption that core curricular content could satisfactorily be delivered online.

¹ See, for example, data on school closures gathered by the World Bank: <https://www.worldbank.org/en/data/interactive/2020/03/24/world-bank-education-and-covid-19>. On Japan see <https://www.tes.com/news/school-reopening-pandemic-plans-nations-compare-uk-france-germany-italy-japan-usa>

² <https://blogs.lse.ac.uk/politicsandpolicy/learning-during-covid19/>

The longer the period of school closure, the more severe the impact of a ‘digital divide’. This widens to a digital gulf between privileged learners and the impoverished masses in societies ...

The longer the period of school closure, the more severe the impact of a ‘digital divide’. This widens to a digital gulf between privileged learners and the impoverished masses in societies such as the Philippines, where schools remained closed for more than eighteen months (**UNICEF, 2021**).

One natural response to such a divide is to attempt to close it, and this is where many multilateral bodies have focused attention during the pandemic. For example, UNICEF teamed up with Microsoft in the Spring of 2020 to launch a digital learning platform³, while UNESCO established a Global Education Coalition with support from various Big Tech sponsors. Many of these corporations profited hugely from the pandemic, even while their ‘tax-efficient’ strategies depleted resources

for funding state schools (**Neate, 2021**)⁴. Along with any learning benefits then, there are significant risks in partnering with corporations with a huge vested interest in digital learning ‘solutions’. Such partnerships may implicate multilateral bodies and governments in legitimating a technology-driven overhaul of schooling with potentially serious effects both for equity (by rendering learners increasingly dependent on home or familial resources) and control (including the power to shape conceptions of its purposes) over education. The term ‘pandemic pedagogy’ has been used to describe the ‘prototype of education as a private service and an opportunity to recentralize decentralized systems through platforms’ (**Williamson, Eynon and Potter, 2020**).

³ <https://news.microsoft.com/2020/04/19/unicef-and-microsoft-launch-global-learning-platform-to-help-address-covid-19-education-crisis/>

⁴ <https://en.unesco.org/news/global-education-coalition-explores-digital-learning-turn-africa>



Along with any learning benefits then, there are significant risks in partnering with corporations with a huge vested interest in digital learning ‘solutions’.

Informing the rush to embrace technological ‘solutions’ is often an impoverished, instrumental vision of education focusing overwhelmingly on the competitive acquisition of human capital (see UNESCO MGIEP, 2017). Nuancing the OECD’s position on skills generation, Andreas Schleicher recently declared:

... if we want to stay ahead of technological developments, we have to find and refine the qualities that are unique to our humanity, and that complement, not compete with, capacities we have created in our computers, schools need to develop first class humans, not second-class robots. (cited in Watson, 2021)

But even while alluding to ‘qualities unique to our humanity’ and the dangers of excessive competition, Schleicher underlines the

imperative of staying ‘ahead of technological developments’. Technology is portrayed as an objective fact of life shaping our reality, compelling us to become ‘first-class humans’ in order to out-compete ‘robots’. Hardly a liberating or humanizing vision, this is effectively a call to gird ourselves for an intensified drive to reconfigure our ‘human capital’, exacerbating the blight of meritocratic competition.⁵

China exhibits the meritocratic pathology in its extreme form, and there the state has recently signalled a determination to tame technology and curb educational competitiveness. In 2021, the government introduced stringent new controls on private tutorial schools (online and offline), sought to restrict children’s use of video games and took various measures to rein in over-mighty technology firms (Kynge and Sun, 2021). However, an intensification of

⁵ We are grateful to Paul Morris for drawing our attention to Schleicher’s pronouncements on ‘first-class humans’.

⁶ Measures mooted include requiring gaming firms to use facial recognition technology to gauge the age of individuals playing their games online.

In other words, thanks largely to technological advances, we command sufficient resources today to feed, clothe and house all humans without submitting them to lives of exhausting, degrading drudgery.

monitoring and surveillance – also associated with the COVID-19 pandemic – reflects the underlying imperative of strengthening Communist Party control over society.⁶ Nor will such measures diminish the competitive pressures learners face, rooted as they are in socio-economic insecurity and massive inequality (**Vickers and Zeng, 2017**).

But just as science and technology can pose threats to human flourishing, and to visions of learning capable of sustaining it, they also offer great promise. The

economist J.M. Keynes, writing at the onset of another wrenching global crisis (the Great Depression), dreamt of a world where technology would liberate us from the need to work – ushering in the ‘15-hour week’ (**Keynes, 1930**). Keynes arguably underestimated the centrality of work to our sense of self or of our own dignity and purpose. However, as Susskind (**2020**) argues, he was broadly correct in his calculations of the productive potential of technology by around the year 2000. In other words, thanks largely to technological



1.5

Towards a new agenda for education – and politics

The analysis of ‘context’ here and in subsequent chapters challenges us to question the terms in which debate over education’s relationship to ‘human

flourishing’ is conducted around the world today. Despite a recent shift in language on the part of some multilateral organizations, encompassing talk of ‘twenty-

...maximizing public discourse on education remains overwhelmingly focused on the maximization of human capital for economic growth.

first-century competencies' or the importance of 'social and emotional learning', maximizing public discourse on education remains overwhelmingly focused on the maximization of human capital for economic growth (**UNESCO MGIEP, 2017; OECD, 2019**). Meanwhile, in many societies, this instrumental focus on human capital is combined with increasingly chauvinistic, intolerant messages concerning the intrinsic superiority of 'our nation', and the malignity or inferiority of ethnic or foreign 'others' (**WG2-ch8; see also Konzcal and Moses, 2021**). Across much of the world, education systems embody a narrowly instrumental vision of learners as potential units of productive capacity – as patriotic worker ants loyally devoted to the cause of enhancing national prosperity and state power – and not as autonomous agents entitled to challenge established state agendas and participate in shaping new ones.

To challenge the human capital orientation is not entirely to deny its validity. The instrumental

functions of education – for example in imparting skills that enhance employability and productivity – are crucial for individuals and societies, as Sen (1999) emphasizes. The instrumental utility of the skills education imparts will always be inextricably bound with the intrinsic value of learning as a basis for human flourishing. But the overwhelming focus on economic utility, employability and – in many societies – subordination to an overarching goal of national aggrandizement, implies a chronically impoverished vision of education. It is a vision whose unsustainability is also more and more obvious, in a world already ravaged by climate change, and where technology increasingly complicates the task of preparing learners for the workforce, undermining the promise of security through employment.

Other voices have sought to articulate more sustainable and humane visions. As this report was being finalized, UNESCO's FEC published its final report,



... the overwhelming focus on economic utility, employability and – in many societies – subordination to an overarching goal of national aggrandizement, implies a chronically impoverished vision of education.

calling for a new ‘social contract for education’ (**UNESCO, 2021b**). This affirms the transformative and empowering potential of education: ‘to shape peaceful, just and sustainable futures, education itself must be transformed’ (**UNESCO, 2021b, p. 1**). Invoking ‘a shared vision of the public purposes of education’, the FEC stresses that the new ‘social contract’ must ‘unite us around collective endeavours and provide the knowledge and innovation needed to shape sustainable and peaceful futures for all anchored in social, economic and environmental justice’ (p. 2). It argues, as we do in **WG2-ch10**, for the need to ‘champion the role played by teachers’ (p. 2), and offers recommendations for changes to ‘pedagogy’, ‘curricula’, ‘teaching’, ‘schools’ and various ‘social and cultural spaces’ for education (p. 4), with a view to ‘[allowing] us to think differently’ (p. 3). In short, there is much in the FEC report that all should find easy to endorse.

At the same time, in emphasizing the potential of education to

transform consciousness, and thereby transform the world, the FEC report implicitly assumes as its starting point a global ethical and political consensus for which there is little evidence. When it condemns reprehensible ‘democratic backsliding’ in many societies, it invokes values to which many key stakeholders simply do not subscribe. Enacting the new ‘social contract for education’ would require, first and foremost, a sweeping transformation of the political and ethical context: in effect, a global cultural revolution. Reducing competitive intensity, promoting teacher agency and other goals the FEC promotes are impossible to achieve through changes to educational institutions and practices alone. Educational change, to be effective, must be pursued in tandem with reforms to labour markets, welfare arrangements and the entire structure of social, economic and political institutions within which education is embedded. In other words, we must challenge the inside-out assumption that change necessarily proceeds from

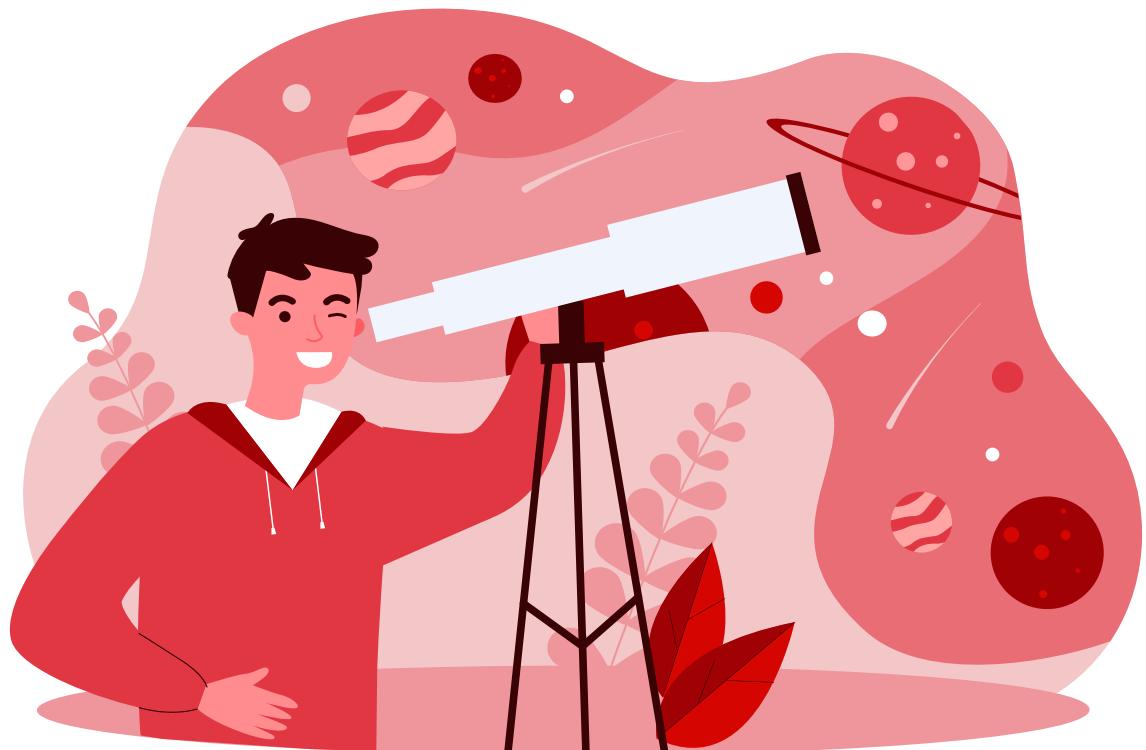
Rampant credentialism, and the meritocratic ideology that legitimizes it, diminishes our capacity to realize a vision of education as an inherent component of the fulfilling life.

education outwards to society, and adopt a more outside-in perspective, recognizing how far education's potential is shaped and constrained by context.

Necessary alterations to that context could begin with the practices, institutions and beliefs that promote intense educational competitiveness. Distinct from both the intrinsic value of learning, and its utility in imparting economically useful 'skills', is its role in marking and sorting individuals. The corrosive effects of meritocratic competition constitute a recurrent theme of our analysis here (**especially in WG2-ch3 and WG2-ch9**). Rampant credentialism, and the meritocratic ideology that legitimizes it, diminishes our capacity to realize a vision of education as an inherent component of the fulfilling life. Meanwhile, the promise held out by meritocracy's naïve cheerleaders – that education can equalize opportunity and legitimate social inequality – has proven blatantly hollow in societies where mobility declines and the intergenerational transmission

of privilege escalates (Vickers and Zeng, 2017; Markovits, 2019; Sandel, 2020). Faith in meritocracy and in the power of education, almost alone, to transform societies for the better reinforces a focus on 'equality of opportunity' (as distinct from actual equality) and legitimates low-tax, low-welfare public policies. It thus underpins a neoliberal 'promissory' regime that derives legitimacy from the credibility of promises that education can painlessly transform livelihoods and usher in a future of greater prosperity and fulfilment for all (Beckert, 2020). However, as inequality worsens, as the climate crisis intensifies, and as the promise of a 'better tomorrow' rings false for millions across the world, social anomie, disenchantment and resentment spread. The outcome is to provide increasingly fertile ground for populism, nationalism and varieties of religious and ideological fundamentalism.

Just as education's transformative potential is real, yet limited and double-edged, so too is that of science and technology.



Scientific advances, technological innovation and related refinements to assessment methods (for example), have potentially important roles to play in enhancing learning and pedagogy,

but, if put to inappropriate use, they also carry risks – as the COVID-19 pandemic has illustrated dramatically (**Williamson, Eynon and Potter, 2020**). The risks include undermining

During the pandemic, disinvestment in (or restriction of academic freedom affecting) social sciences and humanities, alongside greater privileging of STEM fields, has intensified in many societies.

or devaluing the crucial human relationships between teachers and students, and amongst students themselves, as well as new dimensions of inequality (due to differential access to technology). Exaggerated faith in the capacity of technical adjustments to the delivery of learning to achieve social transformation is part and parcel of the neoliberal/meritocratic outlook, and of all ideological creeds that take a fundamentally instrumentalist, human capital-oriented approach to education. Moreover, many of the claims made for the transformative potential of science and technology are, like those advanced on behalf of neoliberalism, ‘promissory’; these fields derive much of their legitimacy from credible promises of future achievement, rather than a substantial record of transformative change.

A serious reassessment of the idolatry surrounding science, technology and the prevailing meritocratic and neoliberal orthodoxies is therefore urgently

needed. This will require critical, mutually respectful and open-ended collaboration between natural scientists and researchers with expertise in the historical, political, social and cultural context of our education systems. However, in public policy today, a widespread and profound imbalance persists between support for the social sciences and humanities and for so-called STEM (science, technology, engineering and mathematics) fields. During the pandemic, disinvestment in (or restriction of academic freedom affecting) social sciences and humanities, alongside greater privileging of STEM fields, has intensified in many societies (Kakuchi, 2020; Sears and Clark, 2020; Trivedi, 2020). This typifies the persistence of an impoverished, instrumentalist vision of the purpose of education, even in the face of crises that urgently demand social analysis, ethical reflection and political action. Natural science alone cannot supply a blueprint of the ideal society or the perfect education system, and the delusion that it can (or should) has accompanied some of the most



... missing from most contemporary debate is the promise of technology – if deployed on behalf of all, rather than to enrich a few – to enhance economic security, curb soulless drudgery, and free us to enact a more expansive and humane vision of education.

disastrous political experiments of the past century (**Arendt, 2017**).

Meanwhile, missing from most contemporary debate is the promise of technology – if deployed on behalf of all, rather than to enrich a few – to enhance economic security, curb soulless drudgery, and free us to enact a more expansive and humane vision of education. Yet another unrealized ‘promissory future’, this was the vision of J.M. Keynes when he predicted that technology would liberate future generations to devote more time and energy to cultural pursuits (**Keynes, 1930; Susskind, 2020**). It is perhaps this kind of vision towards which UNESCO’s FEC sought to point when, in its interim report, it talked of the need for ‘regenerative education’ (**UNESCO, 2021a**).

However, there remains the danger that concepts such as ‘regenerative education’, or ‘a social contract for education’, like ‘lifelong learning’ before them, may be hijacked by vested interests determined to shore up an unsustainable status quo (**Elfert, 2017**). ‘Lifelong

learning’, originally promoted by UNESCO as intrinsic to a vision of education that liberates and expands human potential, came – in the hands of the OECD, the European Union, national policy-makers and corporate actors – to be interpreted primarily as a requirement that workers constantly update and renew skills rendered obsolete by technological change. This requirement to adapt ourselves ceaselessly to technology subordinates humans to machines, confining rather than expanding our capacity to flourish. It is all too easy to imagine ‘regenerative education’, for example, being interpreted in precisely the same way, if it is tied to a prime imperative to ‘regenerate’ human capital in the face of technology-induced obsolescence. What our world requires is a radical reversal of this equation, so that citizens, policy-makers and educators ask first what needs to change in our politics, societies and education systems if we are to put technology and science to the service of humanity, rather than the other way around.



CHAPTER



1.6

Key Messages

The following does not represent a summary of the findings of **WG2**, but highlights some of the core themes that emerge from this introductory chapter, and that have informed analysis of the ‘contexts of education’ in

subsequent chapters.

The pursuit of learning is both intrinsic to the flourishing of human life, and instrumental in creating the conditions that enable us to flourish.





Appreciation of education's intrinsic and instrumental value takes us beyond a narrow 'human capital' paradigm, underlining the importance of seeing learners as ends in themselves, not as means (to the pursuit of economic growth, corporate profit, national aggrandizement or other external purposes).

Analysis of the contexts of education – encompassing history, politics, ethics, culture, economics, science, technology and more – is crucial to understanding the conditions conducive to realizing education's potential contribution to human flourishing.

Awareness of education's enormous benign potential must be balanced by appreciation of

the ways in which it can be turned to deeply malign purposes, and of the role that contextual factors play in making benign or negative outcomes more or less likely.

Transdisciplinary collaboration has a crucial role to play in such research, but must eschew notions of disciplinary hierarchy, and proceed in a spirit of mutual respect and openness.

Contextual analysis teaches us the limitations as well as the potential of education, compelling us to ask not just how education can transform society, but how social transformation can foster the conditions necessary to realize a more humanistic vision of education.

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C H A P T E R



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This chapter takes an ambitious look into global change and the contextual dynamics that are facing education in the twenty-first century. Starting with a broad look at the sustainability–education nexus from economics and the sustainability sciences, we then consider scientific insights on sociocultural, psychological and behavioural barriers as well as motivators to pro-environmental action and the different intervention pathways that might promote individual and collective sustainable behaviour. But recognizing the dangers of overemphasizing individual behavioural adaptation in light of powerful structural obstacles to change, we go on to problematize some of the epistemic underpinnings of modernity and consider the role of education in both enabling and hindering cultural and ecological transitions. We then turn to the question of how to achieve this sort of deeper educational transformation, proposing a move away from an individualist paradigm towards a more relational approach to one another around the world and to nature. Drawing on insights from the environmental and sustainability education movement and some of the transformative education dynamics emerging from this field, we present the key messages and implications of this chapter, focusing on the need to work with interdisciplinary perspectives towards more sustainable, humanistic and transformative approaches to education.

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2.1

Introduction

Contextual dynamics have played a significant role in the emergence of modern education systems as we know them today.

Colonial histories, the industrial revolution and the dominance of fossil-based capital development patterns would not have been





In order to recognize the need for radical transformation of education in the direction of greater sustainability, it is important to grasp the history, politics and science of humanity's detrimental impact on the natural environment.

possible without the scientific and educational processes that characterized the eighteenth, nineteenth and twentieth centuries. Such contextual dynamics have brought us to the current state of educational flux, with a desperate need for reinvention in the face of pressing and complex global changes. These include global health concerns (highlighted by the COVID-19 pandemic), economic pressures, technological developments, continuing or worsening social injustice and inequality and, overshadowing all else, the climate crisis.

Central to the narrative of this chapter is the role of education in addressing such global challenges: is education (as currently constituted) a solution to global inequalities and socio-ecological injustices? Or does it entrench or reproduce now outdated paradigms, further pushing humanity towards catastrophe? The argument of this chapter is that a renewed focus must be placed on reframing the dominant human capital paradigm

of education by placing far greater emphasis on sustainable, humanistic and transformative approaches, building on previous work in this vein by UNESCO (**International Commission on Education for the Twenty-first Century, 1996; UNESCO, 2015b; UNESCO MGIEP, 2017**).

In order to recognize the need for radical transformation of education in the direction of greater sustainability, it is important to grasp the history, politics and science of humanity's detrimental impact on the natural environment. Through engaging critically with the human capital paradigm, **section 2.2** begins by broadly exploring contemporary contextual challenges as articulated by economic, environmental, geographical, population and earth system sciences, referred to collectively as the sustainability sciences. The micro level is the focus of **section 2.3**, which presents scientific insights on sociocultural, psychological and behavioural barriers, as well as motivators to pro-environmental action and the different intervention pathways that can potentially

Drawing on insights from the environmental and sustainability education movement and from various disciplines, the chapter highlights important themes that remain largely absent from a transformative education perspective, shedding light on the question of what it takes for education to critique its own paradigm.

promote individual and collective sustainable behaviour.

Moving beyond the discussion of symptoms of unsustainability, towards analysis of its possible root causes, **section 2.4** problematizes some of the epistemic underpinnings of modern science and considers the role of education in enabling (and hindering) cultural and ecological transitions. Offering political-ecological and cultural-historical perspectives, and engaging with recent debate over the role of ‘coloniality’ in shaping educational institutions and discourse, this section points to the need for a transformation of education systems that cannot be fully captured by the sustainability sciences or addressed simply by the promotion of ‘pro-environmental’ and ‘pro-social’ behaviour.

Section 2.5 then turns to the question of how to achieve this sort of deeper educational transformation, in a move away from an individualist paradigm towards a relational approach to others around the world and to nature. Drawing on insights from the environmental and sustainability education movement and from various disciplines, the chapter highlights important themes that remain largely absent from a transformative education perspective, shedding light on the question of what it takes for education to critique its own paradigm. We close the chapter with **section 2.6**, where we discuss key messages and implications, focusing on the need to work with interdisciplinary perspectives in understanding the influence of context on education systems worldwide.



2.2

Scientific diagnosis of our environmental malaise

The central role of humanity's relationship with the environment in shaping our history has received growing recognition in recent years (**Turner and Sabloff, 2012**). Substantial scientific work has revealed the risks posed by unsustainable human–environment relations for the well-

being not only of humanity but also of other living beings, and for the viability of our shared habitat itself (**see Box 1 for an illustrative example**). This section provides snapshots of contemporary contextual challenges as articulated mainly by economists and sustainability scientists.

BOX 1: THE COLLAPSE OF EASTER ISLAND: HUMAN–ENVIRONMENT INTERACTIONS ON A CIVILIZATIONAL SCALE

A historical case is the cautionary tale of the collapse of the population on Easter Island. A popular theory is that of ecocide whereby the indigenous people of the island, the Rapanui, destroyed their own natural environment, thus bringing about the disintegration of the social and political structures of their society (Diamond, 2011). Interestingly, new theories are emerging suggesting that, rather than solely self-inflicted, the

collapse of the Rapanui society was exacerbated by the arrival of Europeans, whose colonizing drive contributed to the Island's collapse through disease and subjugation of the local population (DiNapoli et al., 2020). This example demonstrates the dynamic and complex interplay between humans and their environment, and is a forewarning of what can happen when such interactions become unbalanced and unsustainable.

2.2 .1

PROBLEMS EMERGING IN HUMAN–ENVIRONMENT RELATIONS

A fundamental dilemma in human–environmental relations

is the balance between resource use and human development. In terms of contemporary human development, the Club of Rome published a report in 1972 that predicted the limits to growth on earth by 2072, based on a computer simulation of exponential economic and population growth given a finite supply of resources. Although critics argue the predicted results do not sufficiently consider the

... it has long been clear that our current economic paradigm based on infinite growth does not square with the finite resources of Planet Earth.



Countries boosting their economy by simply extracting more from local nature typically experience a level of natural capital degradation that outweighs gains in GDP and human capital.

role of socio-economic factors such as technological progress in ameliorating problems of resource depletion, pollution and food production, it has long been clear that our current economic paradigm based on infinite growth does not square with the finite resources of Planet Earth.

From a sustainability perspective, the continued neocolonization of developing countries drives greater extraction, waste and inequity. Extractive industries, which continue to be central to the political economy of many countries in the Global South, received a massive boost in many regions from Western colonialism. When the West was colonizing Africa, Asia and the Americas, colonizers exploited local resources to meet the demands of the

metropolis in their own countries. This colonization drive has today been transformed into a specific growth-oriented development path named neo-extractivism (with Japan and China among the main players, alongside Western powers), in which extraction becomes the main avenue for development to occur (**Schaffartzik et al., 2016**). Increases in GDP per capita, however, are frequently not followed by any positive growth of inclusive wealth per capita (Managi and Kumar, 2018). Countries boosting their economy by simply extracting more from local nature typically experience a level of natural capital degradation that outweighs gains in GDP and human capital (**Kurniawan, Sugiawan and Managi, 2021**) (see Box 2).

BOX 2: THE RELATIONSHIP BETWEEN NATURAL CAPITAL EXTRACTION AND GDP

At the stage of rapid industrial scale expansion that requires more natural capital extraction, usually in developing countries,

increasing GDP per capita often leads to the extraction of more natural capital, while resources to drive GDP

expansion in developed countries are often extracted from offshore – first under colonial regimes, and now under neocolonial extractivist paradigms (**Kurniawan, Sugiawan and Managi, 2021**). Although an annual reduction in the speed of natural capital degradation has been observed in some developed countries, this

reduction has been achieved largely by transferring the burden of resource extraction to developing countries. Furthermore, local employees of neo-extractivist projects often work in oppressive conditions (**Egels-Zandén, 2007**). This poses issues of massive inter- and intra-country inequality, exacerbating the

As the above indicates, our most pressing challenge today is to rebalance the delicate reciprocal relations between nature and human well-being (**Díaz et al., 2018**). According to the Global Assessment of Biodiversity and Ecosystem (IPBES, 2019), nature's contributions to people (NCP) are declining worldwide faster than at any time in human history, with the degradation of ecosystems indicating unsustainable growth patterns in most countries that achieve economic growth through natural capital extraction (**Kurniawan, Sugiawan and Managi, 2021**). Economists tend to treat

nature and NCP essentially as a resource for generating human well-being (**Managi et al., 2019**). The natural capital component of inclusive wealth takes into account both market and non-market assets that contribute to human well-being including ecosystem services and other renewable/non-renewable natural capital resources, such as fisheries, forests, agricultural land, fossil fuels and minerals (**UNEP, 2014; Managi and Kumar, 2018**).

However, the economicistic approach to calibrating the value of nature (or 'NCP'),

... our most pressing challenge today is to rebalance the delicate reciprocal relations between nature and human well-being



Addressing climate change requires collaborative efforts and frameworks among related agents at every level, including individuals, communities, companies, and states, as the Paris Accord has stressed.

while doubtless serving a useful purpose in informing public debate, has been criticized for its anthropocentrism (**Keulartz, 2012**). The challenge for educators, and for all those (economists included) involved in shaping public discourse, extends beyond refining the technical apparatus for calculating how much humanity can afford to extract from nature. The need for transformative change to achieve sustainability has been broadcast with growing urgency by a range of global reports, notably the report of the Intergovernmental Panel on Climate Change (**IPCC, 2018, 2021**) and the Global Environmental Outlook reports (**UNEP, 2019**). Addressing climate change requires collaborative efforts and frameworks among related agents at every level, including individuals, communities, companies, and states, as the Paris Accord has stressed. Key to securing and sustaining this collaboration is fostering greater awareness not just of environmental risks, but also of the issues of socio-economic inequality and social justice with

which these are inextricably intertwined. The impact of climate change and natural disasters on societies varies considerably according to economic capacity and geographic location. Low-income countries are more likely to suffer from the negative impacts of climate change and natural disasters, while the negative impacts on middle-income and more developed countries are relatively weaker (**Coulibaly, Islam and Managi, 2020**), raising issues of climate justice in policy discourse and international practice. Considering the heterogeneous impacts of climate change on different agents is thus essential for effective policy-making and implementation.

Climate change and environmental crisis also have the potential to dramatically corrode social cohesion and damage individual and communal welfare in multiple ways, with ramifications for mental health, social interaction, recreational activity, displacement, cognitive development and quality of life (**Evans, 2019**). Social conflicts

Both the profound cultural and socio-political changes and scientific and technological innovations needed to address sustainability require transformative education that departs from the dominant model fuelling competition on individual and collective levels.

related to climate change are already occurring and will likely intensify across all major regions around the world due to future temperature increase (**Hsiang, Burke and Miguel, 2013**). Meta-analyses of temperature elevation and conflict note that one standard deviation increase in temperature is linked to a 2.1 per cent net increase in the frequency of interpersonal violence and a 11.3 per cent increase in the frequency of inter-group conflict (**Burke, Hsiang and Miguel, 2015**). For the period 1980–2010, one estimate is that 9 per cent of armed conflicts coincided with climate disasters such as droughts or heatwaves, rising to 23 per cent incidence in ethnically highly fractionalized countries including North and Central Africa as well as Central Asia (**Schleussner et al., 2016**). Other research has claimed that the experience or fear of environmental degradation, and an associated squeeze on resources, can exacerbate authoritarian attitudes and the derogation of ‘others’, undermining cohesion and heightening the risk of conflict (**Fritsche et al., 2012**). Even in relatively prosperous North

America and Europe, rising nationalism and populism in recent years can be associated in part with such fears (see **WG2-ch5** for more on the bidirectional relationship between conflict and education and **WG2-ch8** **WG2-ch8** on curriculum and pedagogy for a discussion of how the content of schooling can contribute to fostering, or undermining, the sort of trust and mutual regard upon which effective international collaboration depends).

Both the profound cultural and socio-political changes and scientific and technological innovations needed to address sustainability require transformative education that departs from the dominant model fuelling competition on individual and collective levels. As we highlight in this chapter, in addition to the emphasis on learning interventions aimed at behaviour change (see section 2), the transnational collaboration and sensitivity to our living environment required to achieve this transformation imply ethical and political changes at least as



Continuing natural capital depreciation also threatens to worsen wealth inequality, not least in rich economies where other forms of wealth accumulation are failing to compensate for decreasing natural capital.

profound and far-reaching as any scientific or technological advances. This spirit of collaboration depends crucially on consciousness or awareness of our shared humanity – a quality that is corroded and undermined by the stark inequalities that characterize our world. Figures for 2019 show that the top 1 per cent of the adult population possessed 43.4 per cent of global net worth – while 87.6 per cent of adults together possessed only 16.1 per cent of global wealth (**Shorrocks, Davies, and Lluberas, 2020**). The COVID-19 pandemic is expected to further exacerbate income inequality (**Furceri et al., 2020**). Continuing natural capital depreciation also threatens to worsen wealth inequality, not least in rich economies where other forms of wealth accumulation are failing to compensate for decreasing natural capital. This remains an issue that is yet to be adequately confronted in economic thinking and policy (**Managi and Kumar, 2018**). Taking this critique to another level, it has been argued that the assimilation of nature into capitalist discourse as ‘natural capital’ is based on a

logic of separation of nature and society that has its origins in the post-Enlightenment Western rationality of dominating the world (**Moore, 2016**). We will further discuss, in **section 3**, the ‘invention of (external) nature’ as a root cause of unsustainable human–environment relations and explore a decolonial critique of the dualist (Cartesian) ontologies of ‘human–nature’/‘self-other’/‘subject–object’/‘cognition–emotion’ that have been implicated in a modernity ‘project’ encompassing modern science and modern education.

2.2 .2

DEMOGRAPHIC CHANGES AND THEIR IMPLICATIONS FOR DEVELOPMENT PARADIGMS

One crucial aspect of the sustainability of humanity’s relationship with nature involves



the size of the human population and the demand this implies for agricultural production, energy generation and extraction of natural resources. Since demography is only one of the contextual factors to be considered for reimagining education for more peaceful and sustainable futures, and is usually not given prominence in the discussion of the education–

sustainability nexus, this section highlights demographic trends as important considerations in redesigning education and life long learning systems around the world. According to the United Nations' (UN) projection, the world's population will continue to increase, from 7.7 billion in 2019 to 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100 (**Department of Economic**



Developed countries, especially Japan, Korea and some European countries, will witness rapid ageing over the coming decades.

and Social Affairs, 2020). There are two significant dimensions to this trend. The first is the uneven population growth rate between developed and developing countries: the fastest growing populations will be those of developing countries, in part due to higher fertility rates, while many developed countries already have a growth rate that is close to or below zero. Specifically, the largest increases in population between 2020 and 2050 are projected to take place in India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, Tanzania, Indonesia and Egypt. The second significant dimension is that the populations of most developed countries, with the exception of the United States (USA), are projected to decrease or to remain almost constant henceforward.

These demographic changes will result in a major shift in age structure. Developed countries, especially Japan, Korea and some European countries, will witness rapid ageing over the coming decades. Conventional economic

analyses tend to emphasize that population ageing presents challenges in terms of labour productivity, capital formation and savings rates (Bloom, Canning and Fink, 2010; Harper, 2014; Choudhry, Marelli and Signorelli, 2016). Meanwhile, many developing countries will experience a potential demographic dividend: economic growth brought on by a change in the structure of a country's population, usually a result of a fall in fertility and mortality rates, which increases the proportion of the working age population compared to the non-working age share of the population. When a large working population has fewer dependents to support, there is a window of opportunity for improving education and promoting more sustainable economic growth. The capacity to claim this dividend, however, will itself depend on education, as it is argued that a true demographic dividend is a human capital dividend (Lutz et al., 2019).

For developing countries where the population continues to

Also crucial is the development of more sustainable local models of development such as circular, local and regenerative economies that are less dependent on global capitalist and neocolonial extractive models.

grow and is coupled with lower rates of women's empowerment, it is important to change the extraction-based development mode and to construct a comprehensive framework for provision of public goods, if the potential demographic dividend is to be reaped. Otherwise, continued rapid population growth in developing countries threatens to lead to ever more unsustainable levels of 'natural capital' extraction. A growing population requires additional resources to support its basic needs and economic development, especially in societies where the economy remains largely reliant on extractive industries. This situation calls for an urgent rethink of established development paradigms if we are to adequately address issues relating to ecological sustainability (depletion of natural resources, pollution, climate change), economics (poverty, unemployment, low wages, workplace safety), health (hunger, malnutrition and high maternal and child mortality), governance (lagging investments in health, education and infrastructure),

and social order (rising unrest and crime). Advances in technology and the increasing efficiency of natural resource extraction may contribute to addressing these challenges, but will not be sufficient on their own. Also crucial is the development of more sustainable local models of development such as circular, local and regenerative economies that are less dependent on global capitalist and neocolonial extractive models (**see Morseletto, 2020** for an overview of the concepts of circular, restorative and regenerative economies).

Measures to reduce over-exploitation of natural capital must be accompanied by steps to ensure sufficient investment in enhancing human capacity to maintain the productive base of the economy (**Kurniawan, Sugiawan and Managi, 2021**), and to re-orient it towards more sustainable development paradigms that are inclusive, and that reduce extreme poverty without exacerbating wealth gaps. Maximizing this potential requires a strong policy environment for increasing the



Enhanced investment in education is thus economically vital, although – as we shall see – there are dangers in seeing education as an economic panacea, or in overemphasizing the economic rationale for educational investment.

coverage and quality of education and health systems, stimulating job creation (with emphasis on ‘green jobs’ and jobs for sustainable development – **see section 2.2.3**) and supporting women’s empowerment and more socially just forms of labour force participation (e.g. the concept of ‘green and decent jobs’) (**UNEP, 2020**). Enhanced investment in education is thus economically vital, although – as we shall see – there are dangers in seeing education as an economic panacea, or in overemphasizing the economic rationale for educational investment.

Middle-income countries, such as China, Thailand and Brazil, are also likely to face the problems of ageing before the end of the century. To promote ‘healthy’ or ‘active’ ageing in these countries, some of the benefits from their demographic dividends need to be invested in coming decades in the provisions for future seniors, such as social security, pensions and senior health care funds (**Gerland et al., 2014**). With respect to developed countries where the

population is either declining, or constant and rapidly ageing, it is important to find ways to reduce currently unsustainable levels of consumption, promote well-being and enable healthy active living. A stable population with a very low growth rate has many environmental benefits (**Götmark, Cafaro and O’Sullivan, 2018**). Halting population growth is essential to mitigating global climate change (**Wynes and Nicholas, 2018**); avoiding a mass extinction of Earth’s species (**McKee, Chambers and Guseman, 2013; Crist, Mora and Engelman, 2017**); sharing food more equitably across the planet and feeding millions of malnourished people in the developing world (**Hall et al., 2017**); limiting freshwater withdrawals from natural ecosystems while providing sufficient water for human and wildlife populations (**Rodell et al., 2018**); and in general staying within the limits of prudent human use of the biosphere (**Watson and Venter, 2019**). Given the already high consumption level in developed countries, altering current consumption habits is essential, as called for in Sustainable

Development Goal (SDG) 12 on responsible consumption and production, in particular the target 12.8: ‘by 2030 ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature’ (**UN, 2015, p. 23**).

While progress has been made in combating high illiteracy rates and achieving universal primary enrolment, concerns regarding the quality and economic relevance of schooling and the innovative capacity of higher education are widely shared

While it is certainly true that societal ageing will have a negative impact on public finances in the medium term, the consequences in the long run are expected to be much milder (**Kluge et al., 2014**). In fact, population ageing could present opportunities in a number of ways. An older, shrinking population is likely to be more educated (with more investment per child), cleaner (generating less pollution and fewer greenhouse gases) and healthier (with its citizens spending a greater proportion of life in wellness) (**Kluge et al., 2014**), although these outcomes are far from guaranteed. As discussed in **section 2.2.3**, the development of education systems plays an important role in addressing the size and structure of the world’s population, presenting

both challenges and opportunities for future development and carrying important implications for achievement of the SDGs.

2.2 .3

IMPLICATIONS OF DEMOGRAPHIC TRENDS ON LIFELONG LEARNING SYSTEMS

In light of the above demographic trends, what role can or should education play in ensuring the productive deployment of these ‘human resources’ – or offering the promise of dignified, fulfilling lives to twenty-first-century citizens? While progress has been made in combating high illiteracy rates and achieving universal primary enrolment, concerns regarding the quality and economic relevance of schooling and the innovative capacity of higher education are widely shared (**ICofE**). Such concerns stem largely from the perceived implications of technological



While the human capital approach remains the dominant paradigm for thinking about education, promoting employability will remain a core purpose of education systems.

change, such as automation, for the labour market, and hence for education. However, as noted in the previous chapter (**WG2-ch1**), technological change has also led some to criticize the very basis of our standard assumptions concerning the economic function of education. In *A world without work*, Daniel Susskind (2020) argues that as technology will increasingly transform the number and quality of available jobs, making ‘employability’ the core or overarching purpose of education systems is no longer sustainable. This demonstrates the need to think about the central purpose of education in terms other than maximization of employability, and also to rethink the meaning of work, seeing it as a source of intrinsic fulfilment, as well as (or rather than) economic security (see **WG2-ch6** for more on the relationship between education and technology). Lifelong learning is often touted as an appropriate educational response to technological change or the skills shortages resulting from changing demographics. Related policies are portrayed as enabling workers to

‘re-tool’ or ‘up-skill’ to meet the changing demands of the labour market, as well as promoting more fulfilling, even liberating, lifestyles. However, in practice, lifelong learning can be experienced as highly oppressive, implying chronic insecurity, and dumping onto workers themselves the responsibility for renewing skills rendered obsolete by technological ‘progress’ (e.g. Elfert, 2017).

While the human capital approach remains the dominant paradigm for thinking about education, promoting employability will remain a core purpose of education systems. But a rapidly changing economic and technological context also means that the notion of what it means to be ‘employed’, and the relationship between employment and livelihoods, require a wider rethinking of established social models and welfare provision. Seen through the prism of human capital, the challenge is typically seen primarily as one of adapting education to a changing economic and technological context through enhanced accommodation

... if we want to move towards a human flourishing paradigm, this will require a deeper societal transformation, involving a more expansive understanding of the relationship between work, learning and life.

of informal as well as formal learning, more diverse learning pathways, and renewed attention to vocational education and training. However, if we want to move towards a human flourishing paradigm (**WG1-ch1, WG1-ch2**), this will require a deeper societal transformation, involving a more expansive understanding of the relationship between work, learning and life, encompassing elements such as a reduced working week and more flexibility in workplace arrangements (changes foreshadowed in some societies in response to COVID-19), while maintaining economic security.

Gender also constitutes a crucial dimension of the challenge that education systems must confront. The much trumpeted demographic dividend will be far smaller than anticipated unless significant strides can be made to increase socially just forms of women's empowerment and labour force participation through an increase in employment opportunities and reduction in labour market disadvantages

(**Desai, 2010**). Developing countries need to enhance investment in girls' education as well as provide greater employment opportunities for women (**Gerland et al., 2014**).

Increasing the availability of early childhood care and education (ECCE) is an effective family policy that can stimulate mothers' work participation (**Brilli et al., 2016; Yamaguchi et al., 2018; Zhang and Managi, 2021**), thus promoting women's empowerment.

Enhancing ECCE also has important implications for child development, as cognitive development and learning in the first five years of a child's life is crucial to ensure a strong foundation for learning. But as with educational debate in general, so with discussion of women's education in particular, there is a danger that a focus on the instrumental value of learning (in terms of enhanced productivity) overshadows its more fundamental intrinsic importance, in terms simply of enhancing the capacity of women to live fulfilling lives.

It is also important for education systems to adequately address



The HE sector is often especially important in providing ‘a stimulating learning environment that helps older adults meet their late-life development needs and can lead them toward a meaningful and positive ageing experience’

the needs of the elderly, especially in the light of trends towards population ageing. Again, this is important not just (or even mainly) for the purpose of enhancing economic productivity, but for more intrinsic reasons relating to the ability of elderly people to lead healthy and fulfilling lives. For example, motivational profiles for exercise among older adults highly influence their health condition (**Ferrand, Martinent and Bonnefoy, 2014**). Older adults who have a high level of self-determined motivation tend to be physically healthier, and educational experience can contribute to elevating such motivation. Research suggests that older adults who take part in learning activities derive both psychological and physiological benefits (**Glendenning, 2000**). The HE sector is often especially important in providing ‘a stimulating learning environment that helps older adults meet their late-life development needs and can lead them toward a meaningful and positive ageing experience’ (**Lin, 2011, p. 768**). Realizing the

potential for ‘meaningful and positive’ lifelong learning in HE to support healthy and active ageing requires reducing resource gaps between urban and rural areas and creating an age-friendly environment in HE institutions (**Lin and Huang, 2016**). It also requires challenging conceptions of HE that see its social value primarily in terms of enhancing economic productivity. The boost to well-being that enhanced opportunities for lifelong learning can bestow on the elderly further implies various incidental benefits to society more broadly; reducing chronic illness and health care costs and supporting the elderly in maintaining an active contributory life for as long as possible helps ensure that all individuals are prepared physically, mentally, socially and financially to cope with an extended period of old age (**Harper, 2014**).

While some societies must address the challenge of rapid ageing, others, primarily in the developing world, confront the demographic trend of a ‘youth bulge’. Compared to the

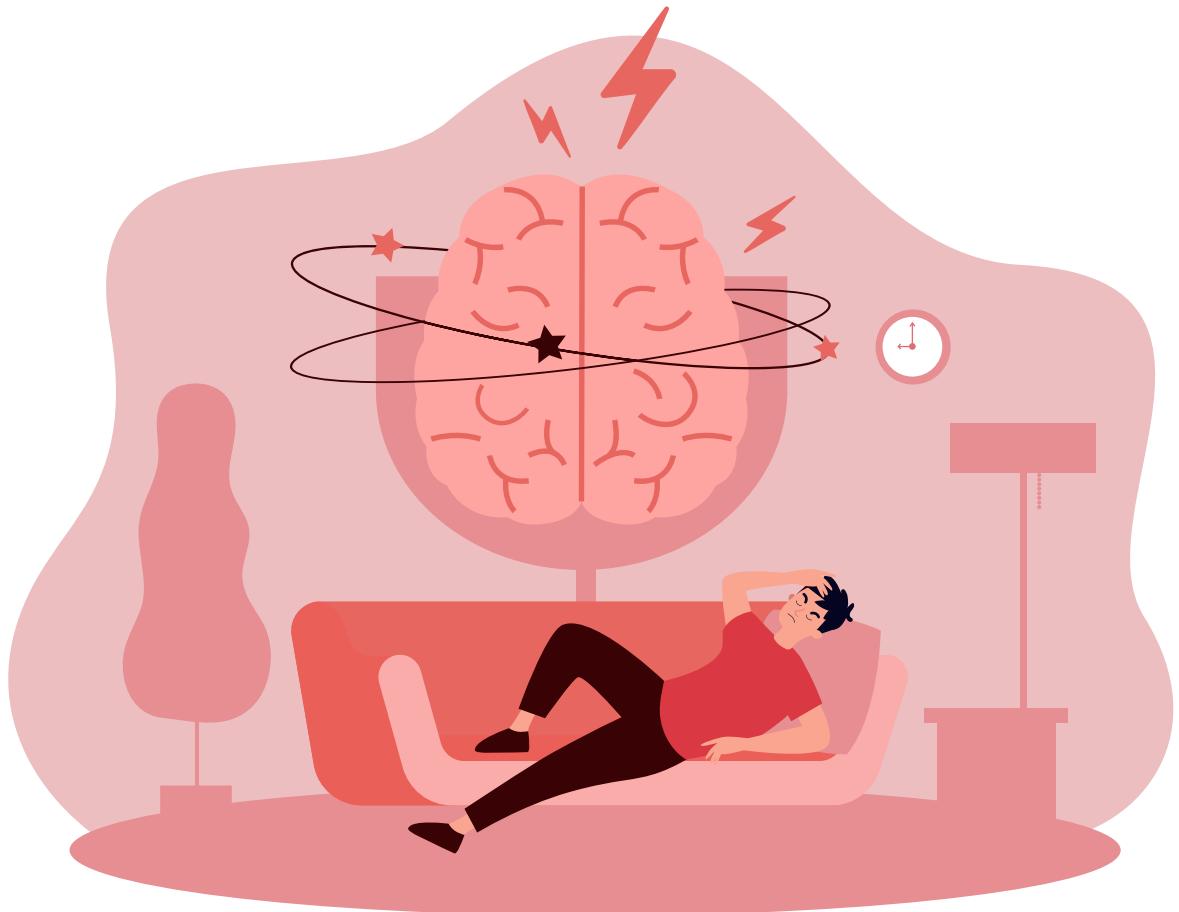
... countries in western Asia and Africa have predominantly youthful populations (Lutz et al., 2019a), with high levels of youth unemployment, and education systems that are ill-equipped to cope with this demographic trend.

European Union, for example, countries in western Asia and Africa have predominantly youthful populations (Lutz et al., 2019a), with high levels of youth unemployment, and education systems that are ill-equipped to cope with this demographic trend. While there is much focus on the demographic dividend that youthful populations can bestow (described above), it is human capital driven by education that brings about the dividend, and that in turn helps drive economic growth and sustainable development (Lutz et al., 2019b). In other words, decreasing fertility rates do not automatically result in increased income for a country unless accompanied by high levels of education. While attention has been paid to demands for enhanced lifelong learning in ageing societies (Slowey, Schuetze and Zubrzycki, 2020), research is needed into the provision of more diverse learning pathways in youthful societies. This should be coupled with renewed attention to vocational education and training in ways that are less narrowly constituted and more oriented

towards sustainable development and the provision of opportunities for further learning across the life course (see ILO/Cedefop, 2011 for a synthesis of 21 country studies of skills for green jobs including both ageing and youthful societies).

While the COVID-19 pandemic has been widely interpreted as showing that investment in human capital is essential to enhanced productivity and health outcomes over the life course (van Dalen and Henkens, 2020), contextual factors relating to technology (WG2-ch6), inequality and social justice (WG2-ch4) and conflict (WG2-ch5) are exposing fundamental flaws in this paradigm. As section 2.4 describes, more attention must therefore be given to the plurality of ways of knowing and being in reimagining education systems.

As emphasized in the previous chapter (WG2-ch1), given the enormous importance of the 'macro' social, political and economic context in influencing individual attitudes and behaviour, reimagining education or remodelling education



systems will not alone effect the necessary social transformation. Nonetheless, the psychological impact of various environmental crises, and the potential of attitudinal or behavioural change to contribute to mitigating their effects, are issues that demand attention. The following sections therefore discuss research on

interventions aimed at promoting behavioural change in response to environmental crisis (2.3.2 and 2.3.3), along with mental health issues linked to environmental problems, in particular climate change (2.3.1).



2.3

Barriers and promoters of pro-environmental behaviour: insights from psychology and behavioural sciences



Recent decades have witnessed growing discussion of learning for sustainable development from a psychological perspective.

Contextual dynamics have played a significant role in the emergence of modern education systems as we know them today. Colonial histories, the industrial revolution and the dominance of fossil-based capital development patterns would not have been possible without the scientific and educational processes that characterized the eighteenth, nineteenth and twentieth centuries. Such contextual dynamics have brought us to the current state of educational flux, with a desperate need for reinvention in the face of pressing and complex global changes. These include global health concerns (highlighted by the COVID-19 pandemic), economic pressures, technological developments, continuing or worsening social injustice and inequality and, overshadowing all else, the climate crisis.

O'Brien (2018) postulates three spheres of social transformation

that dynamically interact: the personal sphere comprises worldviews, values, norms and beliefs, and interacts with the political sphere of structures and institutions, which bring about the practical sphere of solutions in terms of behaviour and technology.

While the previous section focused on some implications for education arising from macro-level contextual factors, ranging from shifting demographics to geopolitical changes, this section hones in on the personal or individual level, discussing the promotion of pro-environmental behaviour as one kind of educational response to environmental crisis, with a particular focus on climate change. Recent decades have witnessed growing discussion of learning for sustainable development from a psychological perspective (Gifford, 2011; Hess and Maki, 2019; Ojala, 2019; Luetz, Margus and Prickett, 2020).¹ Comprehending the

¹WG2-ch1 notes how the COVID-19 pandemic has spurred many governments to intensify a focus on STEM and vocational training in their HE systems.

psychological and behavioural dimensions of the climate crisis, including the behavioural barriers to climate mitigating actions and the psychological impact of climate change, can potentially lead to more effective intervention strategies if combined with other perspectives. Notwithstanding instrumentalist limitations, such analysis can shed useful light on the factors that motivate the translation of environmental knowledge acquired through education to action at the individual and collective levels.

... it is important to highlight the trauma inflicted by climate change and extreme weather conditions, and the potential for education to promote dialogue and empathy that encourage pro-environmental behaviour.

This section highlights a) the psychological impact of climate change (2.3.1); b) barriers to pro-environmental behaviour, that is, how context-dependent and context-independent psychological factors interact (2.3.2); and c) factors motivating pro-environmental engagement, that is, how knowledge, perception and experience of the environmental crisis are seen to affect the brain and behaviour (2.3.3).

2.3 .1

PSYCHOLOGICAL IMPACT OF CLIMATE CHANGE

Beyond disseminating knowledge about the causes of the climate crisis via education, it is important to highlight the trauma inflicted by climate change and extreme weather conditions, and the potential for education to promote dialogue and empathy that encourage pro-environmental behaviour (Thiermann and Sheate, 2020; see Young, Khalil and Wharton, 2018 for a review on empathy towards animals). However, empathy alone is insufficient, and can actually be psychologically damaging. Findings from social psychology and neuroscience show that empathy needs to be accompanied by agency if it is not to lead to feelings of distress and inadequacy (Singer and Klimecki, 2014). And the challenge of endowing learners with agency once again points beyond individuals or schools to the social, cultural, political and institutional context.



Investigation of the effect of air pollution on primary-age children's structural and functional brain measurements found evidence of impairment of functional brain networks (Pujolet al., 2016), indicating physical impacts on human health and well-being.

Besides the plight of the natural world, the impacts of different dimensions of climate change on human physiology are well documented and include increased risk of stroke, heart disease, lung cancer, respiratory infections, asthma and various infectious diseases (Pope et al., 2002; WHO, 2016; Jeremy, 2017; Perera, 2017). Researchers have also explored the links between environmental crisis and mental health. For example, work on the impact of air pollution on mental well-being have shown that increased air pollution significantly reduces hedonic happiness and raises the rate of depressive symptoms in adults and the elderly (Lim et al., 2012; Zhang, Zhang and Chen, 2017; Chen, Oliva and Zhang, 2018; Xue et al., 2019). Investigation of the effect of air pollution on primary-age children's structural and functional brain measurements found evidence of impairment of functional brain networks (Pujolet al., 2016), indicating physical impacts on human health and well-being. As for the effect of bushfires and wildfires, rendered increasingly prevalent by climate

change, a study of groups most vulnerable to the impacts of Australian bushfires found an increase in psychological distress, post-traumatic stress disorder (PTSD) and depression (Bryant et al., 2014). The World Health Organization predicts deaths to increase by an excess of 250,000 between 2030 and 2050 due to well-understood impacts of climate change (Watts et al., 2019).

Beyond increasing the risk of a multitude of diseases, there is also evidence that climate change negatively impacts neurocognitive function, mental health and subjective well-being. There are three distinct dimensions of this psychological impact (Doherty and Clayton, 2011): 1) a direct, acute and traumatic experience, for example, of a sudden or unprecedented natural disaster; 2) indirect, for example, reduced emotional well-being and ecological grief (Cunsolo and Ellis, 2018) due to loss of livelihood or feelings of uncertainty; and 3) psychosocial, for example, chronic effects on community and social well-being due to

The indirect effects of long-term climate crisis on individual and collective well-being are also predicted to be especially significant amongst relatively deprived communities and in poorer societies.

drought, flood, heat or climate-related conflict. The American Psychological Association's Task Force on the Interface between Psychology and Climate Change states that the impact of climate change on mental health is likely to disproportionately affect those with low mobility, including the elderly, children and individuals with pre-existing mental health conditions (Swim et al., 2011). Increased incidence of drought has been shown to increase forced migration and conflict, resulting in elevated risk of PTSD, trauma, anxiety and depression (Wuebbles et al., 2017; see Hayes et al., 2018 for a review). The indirect effects of long-term climate crisis on individual and collective well-being are also predicted to be especially significant amongst relatively deprived communities and in poorer societies (Bourque and Wilcox, 2014, Table 1), with major implications for regional, national and global security and stability (Anderson, 2010).

The implications of climate change for mental health and well-being deserve serious attention

(Murray et al., 2012; Becker and Kleinman, 2013; Vigo, Thornicroft and Atun, 2016), particularly in relation to the overwhelmingly negative emotions the climate crisis can evoke amongst youth. Considering the value-saturated nature of climate change, discussions of its impact need to pivot towards more meaning-focused coping mechanisms, whereby people draw on their beliefs, values and existential goals as they interpret and respond to related challenges (Ojala, 2012). Both problem-focused and meaning-focused coping mechanisms in children show positive associations with environmental engagement. Problem-focused coping also shows increased association with negative emotion states, but meaning-focused coping is associated with greater positive affect such as optimism, hope and purpose that acts to buffer the negative affect (Ojala, 2012). As well as raising awareness through dissemination of scientific knowledge, education therefore also has an important role to play in promoting empathy and compassion towards the natural



... education therefore also has an important role to play in promoting empathy and compassion towards the natural world and general feelings of hope and optimism that can drive meaningful action, and develop agency for transformative change.

world and general feelings of hope and optimism that can drive meaningful action, and develop agency for transformative change (Sannino, 2022).

2.3 .2

SOCIOCULTURAL AND PSYCHOLOGICAL CONSTRAINTS TO PRO-ENVIRONMENTAL BEHAVIOUR

In addition to raising awareness of the causes of anthropogenic climate change, it is important to understand the behavioural constraints that limit climate mitigating actions, and identify interventions that may help overcome these (Gifford, Kormos and McIntyre, 2011). These constraints range from the contextual, that is, social and cultural, to the psychological, with the latter influenced by both context-dependent and biologically inherent factors.

Scientific knowledge about human impact on the climate is a poor predictor of sustainable behaviour, since a range of entrenched – and unsustainable – cultural and societal values, norms and beliefs underpin our outlook and actions (Boström et al., 2018). Social practice theory views individuals as actors embedded within their social contexts (including news and media), with norms and habits inhibiting internalization of outside knowledge and adaptation of behaviour (Johnson and Wilson, 2000; Spaargaren, 2011; Newman, Nisbet and Nisbet, 2018).

Social divisions and ingrained suspicion of out-groups can cause individuals to vary widely in their perception of risks associated with the climate crisis.

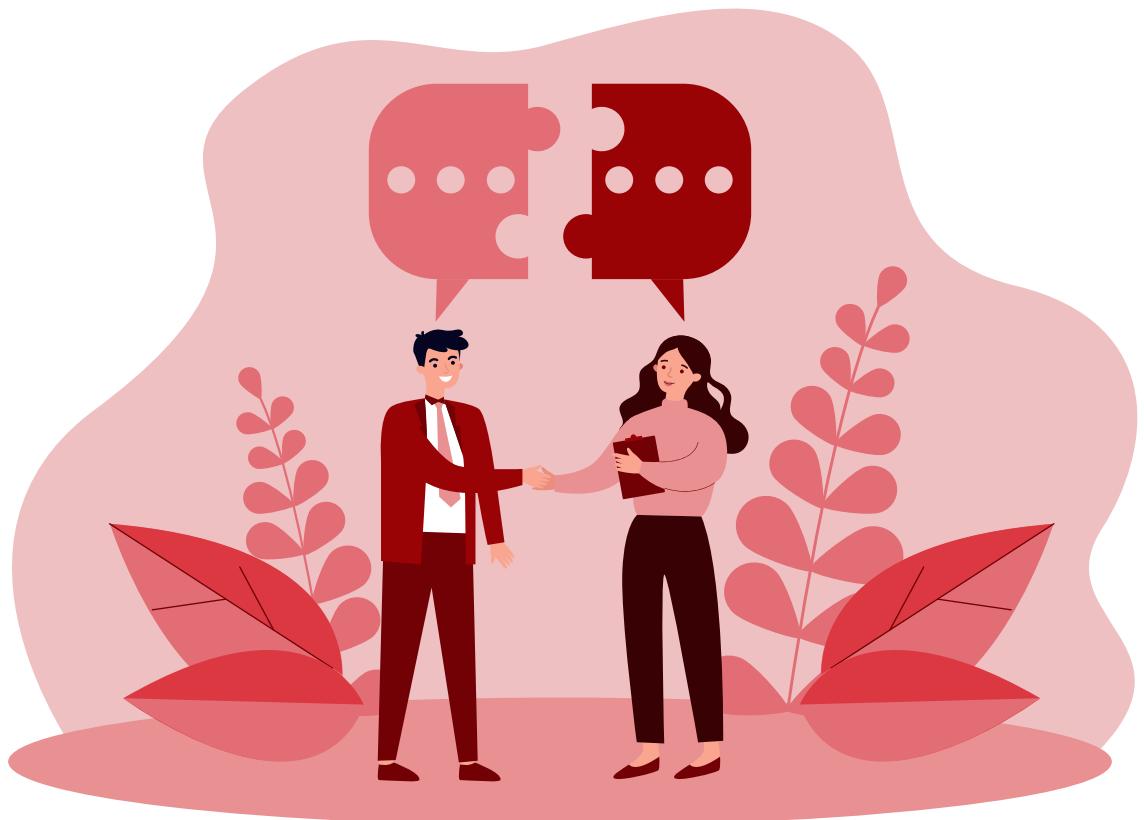
Differences in cultural worldviews have also been shown to be associated with climate change risk perceptions, although these differences often cut across stereotypical cultural boundaries (Xue et al., 2016). For example, a study of a large sample of Chinese nationals found four different cultural worldviews, namely,

... a powerful school of thought on the environmental crisis holds that altering what we consume is not enough; the fundamental problem is our consumption-driven model of economic growth itself.

hierarchism, individualism, egalitarianism and fatalism, which were differentially linked to climate change-related risk perception. Those with egalitarian and non-fatalist outlooks associated climate change with greater risk, and showed greater support for policies promoting pro-environmental changes and heightened willingness to adopt mitigating forms of behaviour. On the other hand, those with more individualistic worldviews were less likely to support pro-environmental policies, even when they perceived the risks associated with climate change. Findings from this study indicate a link between cultural or ethical outlook and support for climate change policy through risk perception (Xue et al., 2016).

Habits and attitudes promoting overconsumption present a significant barrier to sustainability. Many commentators have stressed the need to change the current economic foundations to replace a culture of overconsumption, characterized by inequality, waste and excessive market

control, with more sustainable approaches (Bocken and Short, 2016; Ardley and May, 2020). However, there is a significant division between those who merely call for a switch to consumption of less environmentally damaging products and those who also emphasize the importance of reducing overall levels of consumption (McDonagh and Prothero, 2014). In other words, a powerful school of thought on the environmental crisis holds that altering what we consume is not enough; the fundamental problem is our consumption-driven model of economic growth itself (Klein, 2015). Altering this implies a fundamental challenge to ingrained, culturally conditioned beliefs about what constitutes a fulfilling life – moving from a human capital paradigm based on growth, to a human flourishing paradigm emphasizing human potential and relationships. Changing this poses a huge challenge to our education systems, various aspects of which are explored in subsequent chapters.



In addition to sociocultural constraints, research from environmental and behavioural psychology has provided several insights into the factors that constrain the translation of climate and environmental knowledge

into pro-environmental action. A key observation relates to the weak association between pro-environmental attitudes and pro-environmental actions or the ‘value-action gap’ (**Ungar, 1994; Blake, 1999; Kollmuss and Agyeman,**

Research has shown that even when faced with scientific data that predict the imminent intensification of extreme climate events, many individuals perceive the deleterious effects of climate change as distal and thus abstract.

2002) (see Box 3 for examples of theories that explain the ‘value-action gap’). Learning plays a fundamental role in bridging this value-action gap, for example, through social learning approaches that take an interactive, participatory and negotiated approach to guiding collective problem-solving and decision-making (Glasser, 2007).

Psychological distance and its temporal features are much discussed by researchers in the field of environmental psychology as they seek to understand how the deleterious effects of climate change prompt individuals to perform pro-environmental actions and engage in adaptive resilient behaviour (Maiella et al., 2020). Psychological distance is a construct that describes how the ‘self’ perceives, represents and responds to different features (objects and events) in the external environment. It has four subdomains – spatial, temporal, social and hypothetical – that dynamically interact with each other (Liberman and Trope, 2008). The temporal subdomain, for example,

refers to how the ‘self’ abstractly perceives and mentally represents an event in time: an event perceived as proximal (close) is more real and tangible to the self, whereas one perceived as distal (distant) is more abstract.

Research has shown that even when faced with scientific data that predict the imminent intensification of extreme climate events, many individuals perceive the deleterious effects of climate change as distal and thus abstract (Strombach et al., 2015; Maiella et al., 2020). This can result in diminution of the perceived ‘pay-off’ of climate mitigating action and sustainable behaviour. Consequently, psychological distance from the climate crisis is seen by many researchers as a crucial barrier to promoting action necessary to staving off the worst effects of climate change (Strombach et al., 2015). However, it has been argued that this pattern does not always hold; some individuals may perceive the climate crisis as a distant event but nonetheless engage in climate mitigating actions and



Since young people have the greatest stake in addressing climate change, studying the engagement of youth in climate mitigating action and their levels of trust in climate science can give valuable insights into the prospects of the environmental movement.

adaptive behaviour, and vice versa (see Maiella et al., 2020 for further discussion). In other words, values and ideals may trump a narrowly utilitarian pleasure–pain calculus (related to psychological stimuli or perceptions of likely impact on the self) in influencing the propensity of individuals to take the climate crisis seriously and act accordingly.

Evidence from behavioural and brain sciences underlines the huge challenge involved in generating strong moral intuitions in response to climate change (Haidt, 2001; Bazerman and Tenbrunsel, 2011; Markowitz and Shariff, 2012). This difficulty is attributed to various sociocultural, cognitive and psychological barriers (see Markowitz and Shariff, 2012, Table 1). However, findings from behavioural sciences also highlight several mechanisms that can engage moral values in individuals, an example being the presentation of messages on the climate in such a way as to engage positive emotions – for example, by tempering messages liable to induce fear or alarm by offering hope through the promise of

constructive action at individual and communal levels (Stern, 2012; Wang and Leviston, 2018; Brosch, 2021). Additionally, positively reinforcing community-level pro-social and pro-environmental norms by leveraging our susceptibility to social influence and approval can be beneficial in engaging moral sentiments (Markowitz and Shariff, 2012, Table 2). Since young people have the greatest stake in addressing climate change, studying the engagement of youth in climate mitigating action and their levels of trust in climate science can give valuable insights into the prospects of the environmental movement (Corner et al., 2015; Ojala and Bengtsson, 2019; Ojala, 2021).

In summary, understanding the psychological and behavioural dimensions of debate over climate change and the environment could aid the design of educational programs that more effectively promote attitudes and beliefs conducive to sustainability.

BOX 3: THEORIES ON THE 'VALUE ACTION' GAP IN PRO-ENVIRONMENTAL ATTITUDES AND BEHAVIOUR

... the Theory of Planned Behaviour... posits that behavioural change must be preceded by intention to change which, in turn, is determined by the fulfilment of three conditions.

One of the theories developed to explain the weak association between pro-environmental attitudes and action is the Theory of Planned Behaviour (TPB) (Ajzen, 1991; Ajzen and Fishbein, 2005). TPB posits that behavioural change must be preceded by intention to change which, in turn, is determined by the fulfilment of three conditions: (1) individuals should display pro-environmental attitudes (values, beliefs); (2) their values and beliefs should be congruent with and supported by the social norms of their community; and (3) they should believe they have enough agency to cause positive change. Failure to fulfill any of these conditions can obstruct mitigating action (behavioural change) and adaptation (individual and community coping) (Gifford, Kormos and McIntyre, 2011). TPB has successfully

explained several climate-related behavioural changes (Boldero, 1995; Laudenslager, Lofgren and Holt, 2004), with stronger results obtained through integration of additional factors like habits, norms, past behaviour and self-identity.

A more fully realized model is the General Model of Social Dilemmas (Gifford, 2006), which integrates findings from behavioural sciences with other social and natural sciences, and is informed by geophysical, regulatory, technical and psychological contexts. This model highlights the psychological factors that influence both mitigating and adaptive behaviour at the individual or community levels, including cognitive, affective and motivational components (e.g. denial, cognitive reappraisal and emotion regulation). Some of the psychological barriers



... the General Model of Social Dilemmas highlights the psychological factors that influence both mitigating and adaptive behaviour at the individual or community levels, including cognitive, affective and motivational components...

include the following (Johnson and Levin, 2009; see Gifford, Kormos and McIntyre, 2011 for an extensive review):

- Limited cognition: some of the important components of this dimension are spatial and temporal discounting (in other words, historical and geographical ignorance) (Spence, Poortinga and Pidgeon, 2012); or the Giddens Paradox (Giddens, 2009); reduced valuation of spatially

and temporally distant risks. lack of awareness, uncertainty and perceived lack of control.

- Ideologies that include disbelief in global warming and climate change.
- Social comparison and norms.
- Goals and values that are incompatible with mitigating actions.

2.3 .3

MOTIVATORS FOR PRO-ENVIRONMENTAL ENGAGEMENT: INSIGHTS FROM PSYCHOLOGY, BEHAVIOURAL AND MENTAL HEALTH RESEARCH

While the previous section discussed the sociocultural, psychological and behavioural constraints to pro-environmental and climate mitigating actions, this section explores factors conducive to pro-environmental engagement, in particular, positive affect and prosocial behaviour. Behaviour, lifestyle, and culture exert considerable influence on energy use and associated emissions, and there is some evidence that education in areas such as pro-environmental behaviour and sustainable urban planning can have significantly positive effects in terms of enhancing environmental consciousness

... education in areas such as pro-environmental behaviour and sustainable urban planning can have significantly positive effects in...stimulating a willingness to commit to mitigating climate change.

and stimulating a willingness to commit to mitigating climate change (**Rajapaksa, Islam and Managi, 2018**). A prosocial function that has been widely discussed in the climate change literature is the role of empathy in pro-environmental engagement (**Rifkin, 2009; Krznaric, 2015**). Emotional empathy allows individuals to feel and share the emotions of others and act appropriately, while cognitive empathy is the ability to put oneself in ‘other people’s shoes’ (perspective-taking) to understand their thoughts, intentions and actions (**De Waal, 2008; Singer and Lamm, 2009**). Research shows how humans can also exhibit empathy for nature –through imaginatively identifying with the experience of the natural world (**see Tam, 2013 for a discussion**). The social theorist Rifkin (**2009**) and social philosopher Krznaric (**2014**) both discuss the capacity of empathy to transcend the human/non-human dichotomy and foster a sense of connectedness with the biosphere that supports life. Strong attachment to a particular place can also generate place-based empathy (directed at

both human and non-human inhabitants), promoting locally grounded adaptable behaviour and mitigating action (**Singer and Klimecki, 2014; Head et al., 2016**). Citing O’Brien’s work (**2012**), Brown et al. (**2019, p.16**) posit that the application of ‘an empathy-place-identity lens’ may contribute to integrating ‘the personal, political and practical dimensions of transformation necessary for sustainability’.

Education for behavioural change has been pursued through various initiatives – for example, programs organized by school sustainability leaders, city-wide initiatives focusing on energy consumption, or experiential learning in forest schools (**Newell et al., 2021**). Schools can also act as powerful spaces where behavioural change can be initiated through nurturing values and attitudes and stimulating practices that support imaginative empathy, creating a foundation for sustainable life choices as adults (**Newell et al., 2021**). Schools that promote an ethics of care and compassion along with an exploratory



Schools can also act as powerful spaces where behavioural change can be initiated through nurturing values and attitudes and stimulating practices that support imaginative empathy, creating a foundation for sustainable life choices as adults.

pedagogy can foster both human flourishing and sustainability as evidenced in the global eco-schools / green / sustainable schools movement (**Gough, Lee and Tsang, 2021**). One way of achieving scalable behavioural change is the ‘spiral’ approach advocated by O’Brien and Sygna (**2013**). This involves a socio-ecological learning approach that is ‘iterative, reciprocal and reflexive’ and involves dynamic interactions between ‘individuals, societies, institution and infrastructure’ (**Newell et al., 2021, p. 24 Box 3**). The result, its advocates maintain, is scalable behaviour change from a shallow to a deep level. The global green schools movement reports that when communities are involved in programmes, there is impact at individual, school and community level in terms of social and environmental change (**Gough et al., 2021**).

Formal education is an important component of this spiral scaling for sustainability. However, the fostering of psychological ‘coping strategies’ at the individual level, as well as exhortation to adapt

personal behaviour in the personal sphere of transformation (**O’Brien, 2018**), is, on its own, a relatively palliative or tokenistic response to the global environmental crisis. The scale of this crisis demands communal responses as well as substantive state action and leadership – in other words, first and foremost, a response from the political sphere. Without this, many people, far from experiencing any empowering sense of agency or optimism in the face of looming catastrophe, will feel hopeless and powerless. There is scope for education to contribute to a virtuous cycle, whereby government action and public attitudes reinforce each other, building momentum for change; there are numerous examples of this happening at the local level, as with municipal moves to shift to electric vehicles for public transport. State education should be a strong support of such transformations.

However, the sheer scale and required speed of the necessary societal transformations are daunting, and mean that waiting



for education to gradually effect mass attitudinal change may be completely inadequate. Promoting changes in individual behaviour may make an important contribution to addressing the crisis, but fundamental solutions must be driven by governmental action (in areas such as carbon taxes, promotion of renewable energy technology and regulation of polluting industries). Implying that responsibility lies primarily at the individual level and depends on behavioural adaptation can serve to distract attention from crucial systemic or structural

factors, and end up delaying effective action. Furthermore, insofar as the influence of education acts mainly upon children and youth, it cannot change attitudes and behaviour among the predominantly middle-aged or elderly decision-makers who bear responsibility for our collective fate. Presenting education as the key to salvation can imply a fraudulent attempt to shift responsibility for societal transformation to the very group – young people – who are the ultimate victims of failure by their seniors to act responsibly. The best



... understanding what structural and systemic transformation is needed requires appreciating the historical and epistemic roots of the sustainability education challenge.

way in which governments can contribute to stimulating necessary changes in ordinary citizens' attitudes and behaviour is to lead by example. Public education on environmental matters, and the virtuous cycle of attitudinal change and strengthening policy, must begin with state action, not mere exhortation.

While it is undeniably important, behavioural change at the individual level is crucially facilitated or incentivized by structural and systemic reform; it is not simply a matter of awareness or consciousness raising. Elevating living standards, developing a satisfactory level of infrastructure, ensuring public safety and decreasing social inequality in communities have also been shown to motivate pro-environmental behaviour (Rajapaksa, Islam and Managi, 2018). Income inequality has been shown to be intimately associated with human–environment relations. According to the **World Inequality Report 2018** (Alvaredo et al., 2018), income inequality has increased in nearly all countries since 1980,

with the most rapid increase in North America, China, India and Russia, more moderate increases in Europe, and persistently high inequality in the Middle East. Unevenness in population growth and economic development within and between countries or regions, combined with the unequal distribution of NCP across space and time and among different segments of society, are complicating human–nature relations. Meanwhile, patterns of global trade involving the spatial decoupling of production from consumption, resulting in unequal access to natural resources and unsustainable supply chains, can also lead to social conflicts and further environmental degradation (Shinkuma and Nguyen, 2009; Shinkuma and Managi, 2010). At the same time, in another example of the iterative relationship between attitudinal change and political action, understanding what structural and systemic transformation is needed requires appreciating the historical and epistemic roots of the sustainability–education challenge – the subject of our next section.



2.4

Tackling a root cause of unsustainability: problematizing epistemic underpinnings of modern scientific and educational enterprises

We have noted how achieving longer-term sustainability requires educational changes appropriate to our demographic and economic predicament ([section 2.2](#)) and

measures to promote behavioural change or psychological resilience at the individual level ([section 2.3](#)) in ways that do not reduce these efforts to individualized



Reimagining education and training for sustainability requires acknowledging the inadequacy of dominant epistemologies such as human capital theory that underpin modern education systems.

responsibility but see them within the framework of state-led and wider societal responsibility for transformative change. With this as background, for educational innovations that embrace sustainability to take root and acquire legitimacy, heightened awareness of the historical and political dimensions of the environmental crisis is essential. Public opinion needs to be brought to a balanced and critical understanding of the nature and origins of the economic trajectory that has produced many benefits but also massive risks for modern societies (see section 2.2). Reimagining education and training for sustainability requires acknowledging the inadequacy of dominant epistemologies such as human capital theory that underpin modern education systems. This is perhaps especially urgent in those societies – for example, in Europe, North America and East Asia – that have benefited most from the established economic order, and in which per capita emissions of carbon and other pollutants are highest.

However, for both pragmatic and ethical reasons, it is also important that efforts to lead the public away from unsustainable attitudes and practices do not involve demonization of entire civilizational or cultural traditions but instead embrace epistemic plurality and justice.

2.4 .1

COLONIAL REMAKING OF THE WORLD AND COLONIZATION OF KNOWLEDGE

2.4 .1 .1

HISTORICAL COLONIALISMS AND THE REMAKING OF THE WORLD - THROUGH WESTERN AND OTHER FORMS OF HEGEMONY

Contemporary decolonial political theorists and sociologists point not to the benefits of modern Western

scientific and industrial paradigms, but critically assess these from the ‘darker’ side of modernity, offering an important counter-hegemonic view on science, society and education. The concept of ‘coloniality’, introduced by Peruvian sociologist Aníbal Quijano in the late 1980s and early 1990s, points to the legacy of colonialism that precipitated struggles for liberation in Africa, Asia and Latin America, leading to the early demise of colonial rule after the World Wars (see

Box 4 for further information on historical colonialisms and calls for ‘decoloniality’). This has continued until as recently as 1994, when apartheid fell in South Africa, although today some societies are still under colonial rule or forms of neocolonial domination. Decolonial scholars have argued that ‘coloniality’ underlies the logic of the foundation and unfolding of Western civilization from the Renaissance period until today (Mignolo, 2011).

BOX 4: HISTORICAL COLONIALISMS AND CALLS FOR ‘DECOLONIALITY’

Decolonial scholars have argued that ‘coloniality’ underlies the logic of the foundation and unfolding of Western civilization from the Renaissance period until today.

Historical colonialisms have typically been traced back to early European invasions of colonial territories and the formation of the Americas and the Caribbean, involving massive slave trade out of Africa, and later colonial settlement and control of African and Asian territories amongst others over the past 600 years. The rise of Western colonialism coincided with, and was supported by, the

emergence of early (church-led) and modern (state-led) education institutions. Walter Mignolo’s (2011, p. 3) articulation of the ‘colonial matrix of power’ posits that ‘there is no modernity without coloniality’, given the fact that coloniality included in its matrix the subjugation of local populations and massive extractions of resource flows from colonial territories to today’s so-called developed nations, building the



... calls for
'decoloniality' should
challenge neocolonial
exploitation in the East
and West, or North and
South.

wealth base needed to drive the rise of empires and later industrial capitalism.

However, there is also an important body of scholarship that counters this interpretation of the history of colonialism (or 'coloniality') and capitalism. We may acknowledge the ecological damage wrought by capitalism, as well as its dehumanizing ramifications, while questioning a narrative that lays this entirely at the door of a malign 'Western' civilization. Indeed, the origins of capitalism, along with many of our key modern institutions (including those associated with education, such as competitive, bureaucratically administered examinations), are traceable to Asia, or to a shared 'Eurasian' heritage (Goody, 2006). A highly exploitative, unsustainable relationship with nature, while certainly associated with the rise of 'Western modernity', was already evident in China long before the effects of Westernization were felt there (Elvin, 2004; Glasser, 2018). And colonialism, along with

its legitimating ideology of the 'civilizing mission', has been (and continues to be) as ingrained in the geopolitics and culture of Asian societies as anywhere else (Osterhammel, 2005; Vickers, 2014).

Today, exploitative, neocolonial extractivist policies continue to be practiced by established Western and Eastern powers (e.g. in the fishing, land, mining, forestry, oil and resource extraction industries). It is, therefore, important that scholarship and movements that build on what has come to be known as the 'modernity/coloniality' dyad (Mignolo and Walsh, 2018) and calls for 'decoloniality' should challenge neocolonial exploitation in the East and West, or North and South. As decolonial scholars themselves clarify, whereas decoloniality challenges the 'colonial matrix of power' and aims at delinking from the economy of growth (i.e., 'capitalism' in the vocabulary of liberalism and Marxism), 'dewesternization', which is pursued by some BRICS

For ‘decolonial’ theorists, the ‘fall out’ of capitalism consists not only of the colonial project, but also of massive unsustainability, health and global justice risks.

(Brazil, Russia, India, China and South Africa) countries, merely disputes its control and management (**Mignolo, 2018, p. 146**). Decolonial discourses can be easily appropriated to support regimes that are oppressive, neocolonial and unsustainable in their ideological outlook and economic practice. Therefore,

The influential Argentinian ‘decolonial’ scholar Mignolo (**2011, p. 3**) argues that the massive shift that occurred around 1500 is that of a transformation ‘from a polycentric and noncapitalist world … to a monocentric and capitalist world order from 1500 to 2000’. For ‘decolonial’ theorists, the ‘fall out’ of capitalism consists not only of the colonial project, but also of massive unsustainability, health and global justice risks as articulated in **section 2.2**. Today, global capitalism in its neoliberal form operates in a new, relatively boundary-less form, at times ironically under the banner of ‘sustainable development’ (**Ferguson, 2010**) and other times in the form of ‘disaster capitalism’ (**Klein, 2007**).

caution must be taken not to conflate ‘colonialism’ with ‘coloniality’ (as a darker side of Western modernity) or confuse ‘decolonization’ with the concept of ‘decoloniality’. Decolonization does not guarantee decoloniality and, indeed, often economic coloniality continues and even intensifies after decolonization.

Arguing that the ‘alleged rationality of the profit-maximizing individual became everything’ with the birth of instrumental rationality and the rise of capitalism ‘in the long sixteenth century’, environmental historian Jason Moore suggests that such rationality underpinned subsequent ‘scientific discourses, among them classical political economy and later, neoclassical economics’ (**Moore, 2016, p. 146**). Going further, he claims ‘that rationality – capitalist rationality – is reckless when it comes to the requirements of the whole system. It is a rationality of the parts and not the whole.’ Linking to the discussion above, Moore (**2016, p. 147**) notes that ‘capitalism’s rationalization of the world is



based on externalization, on tapping resources and on loading the spheres of the planet with solid, fluid, and gas waste'. The concept of 'external nature' itself has been portrayed as a creation of capitalist modernity. The dualist ontologies that see entities such as 'individual', 'nature' and 'the world' as existing on their own (prior to their entanglements and inter-relations) have been portrayed as one particular, culturally specific ontology that has come to be taken for granted as 'universal' over the course of half a millennium of Western hegemony (Escobar, 2015). On the other hand, historians have questioned or qualified such arguments, highlighting the Eastern inspiration for many Enlightenment ideas, and showing that the global hegemony of the West (as distinct from its hegemony over the Americas and parts of Africa) was in fact a relatively ephemeral phenomenon of the nineteenth and twentieth centuries (Osterhammel, 2018).

The concept of 'external nature' itself has been portrayed as a creation of capitalist modernity.

According to Mignolo (2011, p. 80), one of the most pernicious

consequences of modernity is that

[the] coexistence of diverse ways of producing and transmitting knowledge is eliminated because now all forms of human knowledge are ordered on an epistemological scale from the traditional to the modern, from barbarism to civilization, from the community to the individual, from the orient to the occident ... By way of this strategy, scientific thought positions itself as the only valid form of producing knowledge, and Europe acquires an epistemological hegemony over all the other cultures of the world.

De Sousa Santos (2014) explains the creation of an 'abyssal line' out of this hegemony, which relegates all ways of knowing that do not conform to the imperially defined hegemonic order to the realm of myth, legend, folklore, local knowledge and so on. Along similar lines, decolonial accounts of climate change trace the origins of climate crisis to historical processes and ideologies rooted in the project of modernity/

It is therefore vital that the critique of ‘coloniality’ and its implications for sustainability avoid inadvertently mirroring the reductionist Eurocentrism that its advocates abhor.

coloniality, but with escalating effects through contemporary ideologies, practices and political and economic arrangements (e.g. Stein et al., 2020). Such arguments offer important insights into the historical and cultural origins of the present predicament, but have been appropriated by non-Western elites (e.g. in India and China) seeking to valorize ultra-conservative, nativist visions of ‘tradition’ as a means of legitimating autocratic political regimes locked into unsustainable economic strategies (Nandy 2003; Hansen, Li and Svarverud, 2018). It is therefore vital that the critique of ‘coloniality’ and its implications for sustainability avoid inadvertently mirroring the reductionist Eurocentrism that its advocates abhor.

2.4 .1 .2

DECOLONIZING KNOWLEDGE

Mignolo and other decolonial scholars, such as De Sousa Santos (2014) and Arturo Escobar (2016), argue for a new shift in the ‘geographies of reason’ that

allows for contextually located epistemic affirmations: ‘I am where I think’, argues Mignolo (2011, p. 80). This challenges the foundational Cartesian rationality on which, they argue, the entire global education system has been based (‘I think, therefore I am’); as social and cultural shifts towards decoloniality seek to democratize and diversify epistemology and ways of knowing and being.

Importantly, Mignolo (2011, p. 82) argues that ‘decolonising Western epistemology means to strip out the pretense that it is the point of arrival and the guiding light of all kinds of knowledge’. In other words, decolonizing knowledge is not rejecting Western epistemic contributions to the world. On the contrary, decolonizing Western epistemology implies appropriating its contributions in order to then de-chain from any overarching imperial designs. The argument is therefore to create epistemic systems that allow for plurality, dialogue, translations between knowledges and epistemically democratic systems of thought, what De Sousa Santos (2014) terms ‘ecologies of knowledge’.



... social and cultural shifts towards decoloniality seek to democratize and diversify epistemology and ways of knowing and being.

It is also important to problematize the simplistic dichotomization of ‘Western’ and ‘non-Western’ (or ‘Northern’ and ‘Southern’) onto-epistemic frames, which can be misleading and divisive (Sen, 2011; Appiah, 2018; Vickers, 2020). Rather than dichotomizing ‘East’ and ‘West’, scholars such as Amartya Sen (2005) and Jack Goody (2006) highlight the shared cultural and philosophical legacy of societies across Eurasia and beyond. Arguments that modern, Western (or ‘post-Enlightenment’) epistemology is uniquely implicated in fostering an unsustainable, exploitative relationship between humanity and nature – and that therefore non-Western, ‘indigenous’ wisdom holds the key to our salvation – deserve serious qualification. For example, surveying China’s environmental history, Mark Elvin concludes that by 1800 the ‘pressure’ of the Chinese productive system on the natural environment was ‘significantly heavier’ than that of France (2004, p. 470). Buddhist and other teachings mandating respect for

nature appear to have had little impact ‘in comparison with the massive effects of the pursuit of power and profit’ (p. 471).

Whatever its cultural or historical roots, the alienation of humanity from the natural environment, and the global dominance of an instrumentalist, exploitative attitude to nature, present formidable obstacles to the achievement of more sustainable social and economic arrangements – obstacles that education can and should play a crucial role in addressing.

2.4 .2

TOWARDS EPISTEMIC PLURALITY

While section 2.2 pointed out the need to address changing demographics the world over and its implications for education system development from the provisioning perspective, it is also important to address the implications of the epistemic

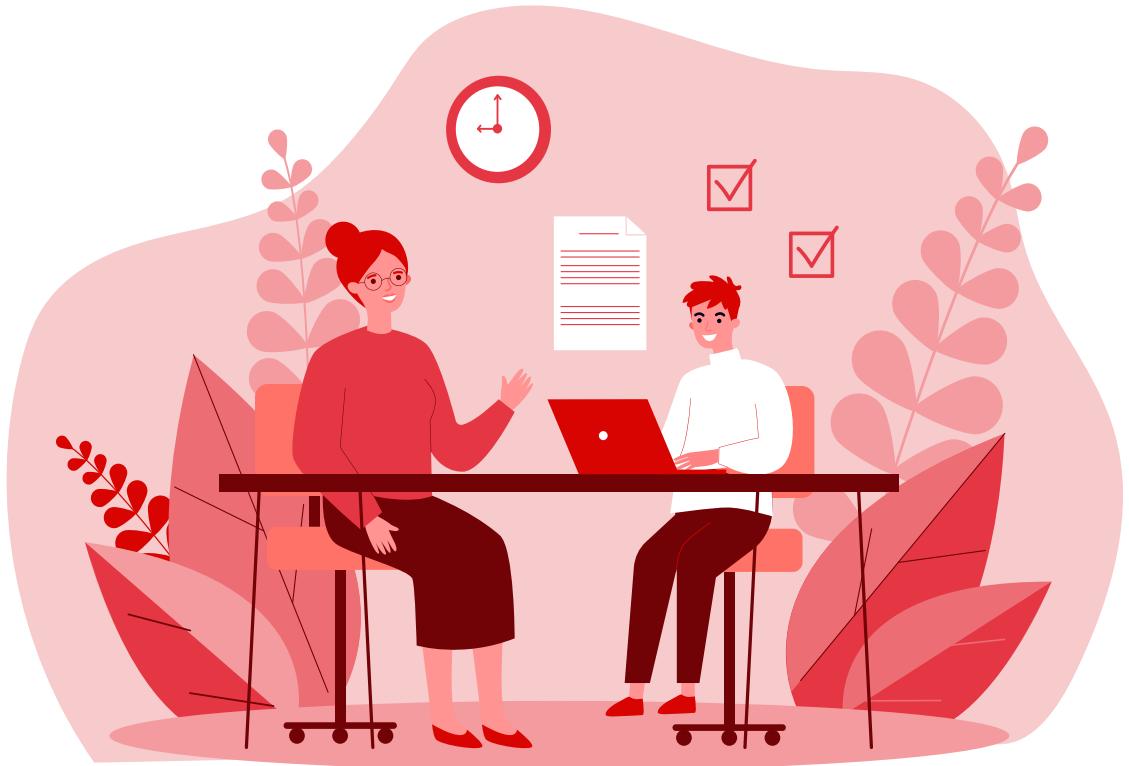
There is a need for relational, inter- and transdisciplinary forms of knowledge that counter the dominant epistemologies of education systems today, not limited by the individualization narrative of modernity/coloniality and capitalism.

and other contextual perspectives raised above on education.

First of all, given the history of slave trading, forced migration and contemporary patterns of migration in which epistemically disavowed colonial subjects are minority citizens or migrants (as highlighted, for example, by the Black Lives Matter movement), one of the major contextual challenges facing education today relates to the ability to accommodate plurality of culture and epistemology (see Box 5 for migration and displacement patterns and their implications for educational and social change). This is as true of unacknowledged and marginalized colonial populations in Asia as in Europe or North America (Roberts, 2020; Vines, 2021). Whether in China or the USA, accommodating plurality needs to happen in ways that are not colonially inscribed, patronizing or narrowing, while also re-imagining the nature–society divide that has been sedimented in dominant epistemic traditions in education systems worldwide – most visible through the specialization and construction

of the standard array of disciplines and subjects.

This kind of challenge was initially raised in the feminist movement, but is now also being raised both in the decolonial movement and in the environmental education movement through the emerging understanding that it is not only a particular type of knowledge that counts in responding to environmental crises, but also our agency to act and participate in structuring a more sustainable future in the places where we live. There is a need for relational, inter- and transdisciplinary forms of knowledge that counter the dominant epistemologies of education systems today, not limited by the individualization narrative of modernity/coloniality and capitalism. For example, there is an emerging body of work in the field of comparative education that looks at an empirical link between individualism and environmental outcomes, which suggests the need for shifting cultures away from individualism to achieve sustainability (Komatsu, Rappleye and Silova, 2019) or



problematizes axiomatic pedagogic solutions based on ‘student-centred learning’ in sustainability education (**Komatsu, Rappleye and Silova, 2021**). The empirical and historical basis for these arguments has been critiqued (**Vickers, 2018**), and much work still needs to be done to establish the epistemic roots of the current sustainability-education conundrum. But while care must be taken to avoid the simplistic dichotomization of ‘individualism’ (bad) and ‘collectivism’ (good) – and the

reductionist depiction of entire cultural traditions as ‘individualist’ or ‘collectivist’ – such work raises important questions regarding some of our most strongly held assumptions concerning education, opening horizons for imagining education systems – and educational scholarship – that truly embrace epistemic plurality.

... there needs to be recognition of the limited capacity of education on its own to smoothly integrate new migrants into host societies.

BOX 5: MIGRATION AND DISPLACEMENT PATTERNS AND THE NEED FOR EDUCATIONAL AND SOCIAL CHANGE

The 2020 **World Migration Report** (IOM, 2020), indicates that there are 272 million international migrants globally (or 3.5 per cent of the world's population), which is an increase from 174 million in 1995. Despite much political attention given to the increase in migration in the past few years, especially by conservative governments or nationalist-populist movements, evidence shows that the percentage of international migrants has long been relatively stable at between 2.8 and 3.5 per cent. The **World Migration Report (2020)** notes that 'the vast majority of people in the world continue to live in the country in which they were born', but that 'more people are migrating to other countries, especially those within their region' (IOM, 2020). Work is the primary reason for international migration, with most migrants moving to high-income countries for this reason. It

is important that education policy pays due attention to this sociocultural and socio-economic phenomenon in education, not least so as to better accommodate migrant children in education systems in non-homogenizing or non-assimilative ways.

At the same time, there needs to be recognition of the limited capacity of education on its own to smoothly integrate new migrants into host societies.

Migration affects different social groups within the host society in different ways, often disproportionately benefiting those from wealthier, more highly educated backgrounds, while exerting downward pressure on the wages of lower-skilled, more economically disadvantaged groups (who also tend to be less cosmopolitan in experience and outlook) (Collier, 2013). This helps explain why, especially in more socio-economically unequal societies,



While migration patterns have remained relatively stable in relation to percentage of population, there is increasing concern about the high numbers associated with global displacement.

fear of mass immigration has granted powerful political leverage to nationalist populists. For transforming our relationships with each other as much as with nature, fostering greater cross-cultural awareness and understanding through education is therefore not enough: there needs to be concrete action to transform the structures and systems that govern our working lives, welfare and access to public goods.

While migration patterns have remained relatively stable in relation to percentage of population, there is increasing concern about the high numbers associated with global displacement. The **2020 World Migration Report** (IOM, 2020) states that 'Global displacement is at a record high, with the number of internally displaced at over 41 million and the number of refugees at nearly 26 million', with the number of refugees being the highest on record,

'although the annual rate of growth has slowed since 2012'. Important for educational responses to contextual dynamics is the insight that, 'at the end of 2018, those under 18 years of age constituted roughly 52 per cent of the global refugee population. From 2003 to 2018, according to available disaggregated data, the proportion of children among stocks of refugees was very high, fluctuating between 41 and 52 per cent' (IOM, 2020). This creates additional need for giving attention to plurality of epistemology, empathy, culture and ways of being in education systems, as migrant and refugee children are included into education systems in ways that do not just subject them to cultural assimilation and the linear epistemic narrative critiqued by decolonial theorists.

Statistics also show that it is mainly unresolved or renewed conflict dynamics in key countries that are producing the

In recent years, decolonial approaches to global citizenship education have called for closer linkages to be forged between global citizenship and environmental and sustainability education.

above situation, such as climate migration and food insecurity and their implications for instability and forced migration and displacement. The top ten countries of origin of refugees and globally displaced people are the Syrian Arab Republic, Afghanistan, South Sudan, Myanmar, Somalia, Sudan, the Democratic Republic of the Congo, the Central African Republic, Eritrea and Burundi, which account for roughly 16.6 million, or 82 per cent of the total refugee population, a pattern that has persisted for over seven years (IOM, 2020) (also see WG2-ch5 of this volume for

more on the nexus between education and conflict). This raises the need to couple peace with sustainability discourses, a focus that has been taken up by UNESCO across its Education for Sustainable Development (ESD) and Global Citizenship Education Programmes, albeit unevenly as will be noted below (see section 2.5). In recent years, decolonial approaches to global citizenship education have called for closer linkages to be forged between global citizenship and environmental and sustainability education (see Andreotti, 2016; Stein, 2019; Pashby et al., 2020; Stein et al., 2020).



2.5

Learning to be and learning to live together in the Anthropocene

Decolonial scholarship and associated movements, combined with contemporary and emerging patterns of migration and displacement, suggest that there is a continued need for deeper transformation away from an instrumentalist paradigm (whether it be liberal-capitalist or autocratic and developmentalist), towards

a human flourishing approach (**WG1-ch2**) that emphasizes our relationships with others around the world and with nature (**WG1-ch4**). This requires balancing an individualized behaviour change narrative with a wider social change narrative emphasizing the intrinsic value of particular liberties or ‘capabilities’ (**Sen**,

UNESCO defines ESD broadly as education that 'empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity.'

2005). In order to achieve a greater focus on education as a 'global common good' (UNESCO, 2015b) and education for human flourishing, we need, in the words of Colombian anthropologist Arturo Escobar (2015, p. 13), 'to step out of existing institutional and epistemic boundaries' in order to 'envision the worlds and practices capable of bringing about the significant transformations seen as needed'.

2.5 .1

ORIGINS AND DEVELOPMENT OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

There have been wide-ranging and long-standing efforts to reorient education towards peace and sustainability. These two interrelated strands of value-based and action-oriented education have each promoted pedagogies that aim to examine

and counteract the root causes of social injustice and environmental crisis. This section broadly refers to them jointly as education for sustainable development (ESD) and focuses on global efforts that have historical roots in a series of UN meetings on international environmental issues (see Box 6).

UNESCO defines ESD broadly as education that 'empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity' (UNESCO, 2014a, p. 12). UNESCO explicitly acknowledges that ESD is 'intended to encompass all activities that are in line with the [ESD] principles irrespective of whether they themselves use the term ESD or – depending on their history, cultural context or specific priority areas – environmental education, sustainability education, global education, development education, or others' (UNESCO, 2013, Annex 1, 2).

Space does not permit in-depth



Space does not permit in-depth discussion of the histories, purposes, scopes and stakeholders of educational movements associated with the UN processes related to peace, human rights and associated areas, such as Education for International Understanding, Human Rights Education, Peace Education, Development Education, and most recently, Global Citizenship Education.

discussion of the histories, purposes, scopes and stakeholders of educational movements associated with the UN processes related to peace, human rights and associated areas, such as Education for International Understanding, Human Rights Education, Peace Education, Development Education, and most recently, Global Citizenship Education. However, it is important to note that UNESCO reporting for the global indicator of SDG 4.7² depends solely on the mechanism

of the ‘UNESCO 1974 Recommendation Concerning Education for International Understanding, Co-operation and Peace and Education Relating to Human Rights and Fundamental Freedoms’ (hereafter 1974 Recommendation). Adopted in 1974 by the 18th UNESCO General Conference, governments have the obligation to report their progress towards implementing the 1974 Recommendation every four years.

BOX 6: THE HISTORY OF EDUCATION FOR SUSTAINABLE DEVELOPMENT AND MAJOR UN MILESTONES ON INTERNATIONAL ENVIRONMENTAL ISSUES IN THE PAST 50 YEARS (1972–PRESENT)

The 1972 UN Conference on the Human Environment in Stockholm called for environmental education to be used as a means to address

environmental problems in its Recommendation 96. In 1975, this recommendation was addressed at the International Environmental Workshop

² The global indicator for SDG 4.7 is the indicator 4.7.1: extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment. The same indicator is used to report on SDG 12.8: by 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature. Similarly, SDG 13.3: improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

in Belgrade, Yugoslavia, organized by UNESCO and the UN Environment Programme, which adopted a global framework for environmental education known as the Belgrade Charter. Internationally, the official launch of environmental education is attributed to the world's first intergovernmental conference on Environmental Education in Tbilisi, Georgia (then the USSR) in 1977, with the Tbilisi Declaration (**UNESCO, 1978**) providing guiding principles for environmental education (EE).

Chapter 36 of Agenda 21 (**UN Conference on Environment and Development, 1992**) is widely considered a foundational ESD text, recommending that 'environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual) development, should be integrated in all disciplines,

and should employ formal and non-formal methods'. The importance of climate change education (CCE) was identified in the same year at the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and was reaffirmed as a priority in the 2015 Paris Agreement.

In 2002, the UN General Assembly adopted a resolution to declare a UN Decade of Education for Sustainable Development (DESD) from 2005 to 2014, acting on a proposal made at the World Summit on Sustainable Development (WSSD) and included in the Johannesburg Plan of Implementation. In the second half of the DESD, the lead agency of the DESD, UNESCO, identified climate change as one of the three action themes for addressing global sustainable development challenges through ESD, along with biodiversity and disaster risk reduction (**UNESCO, 2015a**). In 2012 Rio+20 launched a



process of formulating what later became the Sustainable Development Goals (SDGs). In 2015 ESD has become part of the SDG Target 4.7 focusing on ‘knowledge and skills needed to promote sustainable development’, and CCE part of SDG 13 on climate action (**indicator 13.3: ‘improve education, awareness-raising and human and institutional capacity on climate change mitigation,**

adaptation, impact reduction and early warning’). In 2018, an IPCC Special Report warned that we have only 12 years to avert catastrophic climate change and highlighted the demand for increased CCE to ‘accelerate the wide scale behaviour changes consistent with adapting to and limiting global warming’ (**IPCC, 2018, p. 22**).

It is worth noting that ESD is far from an uncontested term. There is a certain confusion, ideological differentiation and diversity of opinion around the multiple and overlapping educational movements such as EE, ESD and education for sustainability (EfS) (**Grosseck, Tiru and Bran, 2019**). The main terms, EE and ESD, can either be seen as overlapping concepts, or two distinct philosophies, with some scholars highlighting the difference in subject matter and focus between the two (**Briggs, Trautmann and Fournier, 2018**). For example, a challenge

at the heart of debates around educational terms is the concept of ‘sustainable development’ in ESD, which has been linked to expert-based knowledge and top-down approaches to educational reform (**Huckle and Wals, 2015**). In Latin America, for example, some scholars perceive ESD as an imposition of Western neoliberal policies and practices on local cultures, thus reinforcing and reproducing environmental and social problems (**Briggs, Trautmann and Fournier, 2018**). Here, though, we follow Kopnina (2012) in taking the view that, considering the urgency of our environmental

crisis, we should place less emphasis on terminological distinctions (EE/ESD/EfS), and instead focus on radically turning away from neoliberal and anthropocentric education towards education that advances well-being for all and for our planet.

2.5 .2

LESSONS FROM THE ENVIRONMENT AND SUSTAINABILITY EDUCATION MOVEMENT

This section summarizes some of the findings from the environment

and sustainability education movement over the last 50 years and presents challenges and future directions for research and practice. It is based on a review of recent systematic review literature (**from 2016 onward**) on EE, ESD, CCE and EfSD.³

2.5 .2 .1

ENVIRONMENTAL EDUCATION AND ENVIRONMENTAL AND SUSTAINABILITY EDUCATION

EE is a substantive and growing educational movement with a 50+ year history and a considerable body of scholarship (**cf. footnote 4**), that ‘develops and enhances

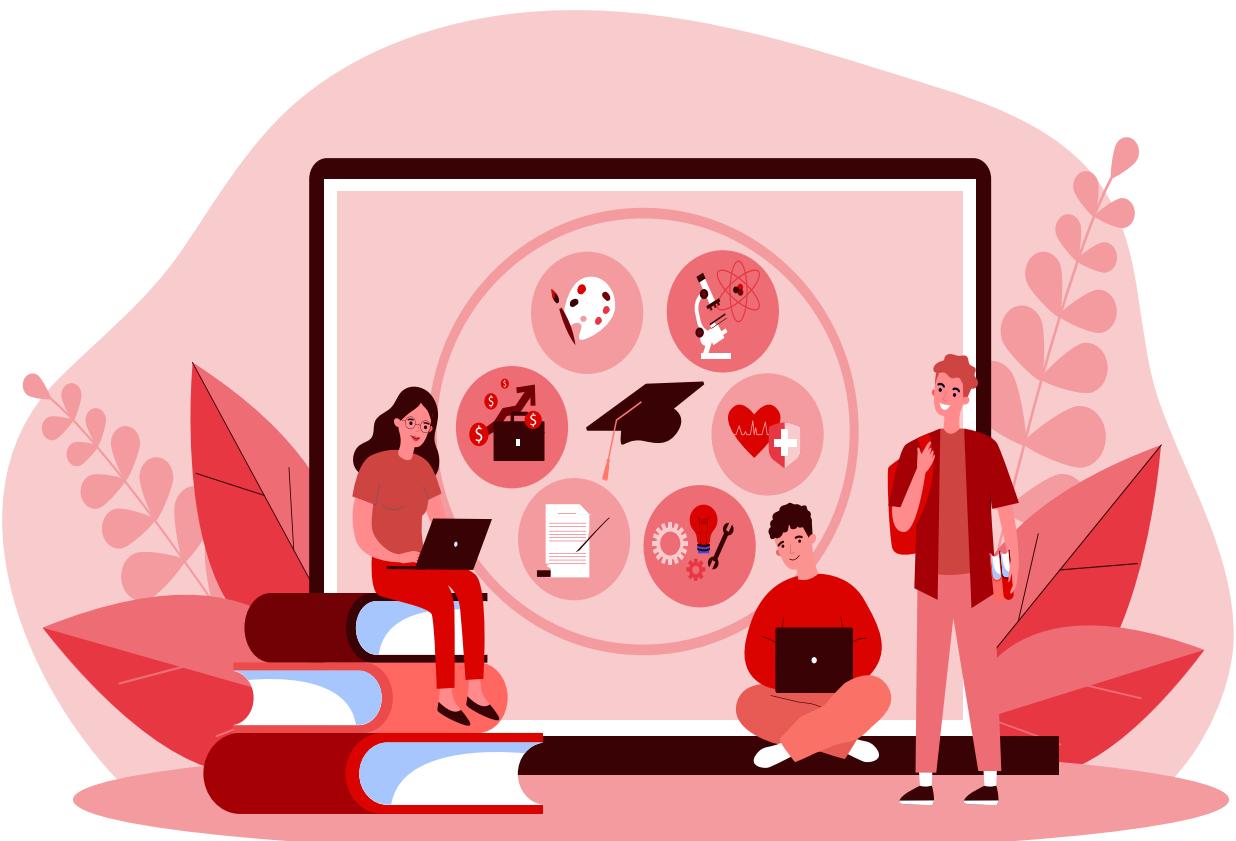
³A systematic review was carried out into EE, ESD, ESE and CCE, in the database Google Scholar. Keywords used were ‘environmental education’ OR ‘education for sustainable development’ OR ‘climate change education’ OR ‘Environment and Sustainability Education’ AND ‘systematic review’ OR ‘literature review’ OR ‘review of research’ OR ‘meta-analysis’, from the year 2016 onwards. Twelve review articles were identified (n=12), and through snowballing methods, four more non-review papers were identified to offer wider geographical scope (n=4). Our intention was not to review all of the EE / ESD / ESE / CCE literature as a Google Scholar search rendered over 500, 000 results: ‘Environmental Education’ rendered 454, 000 papers, ESD 75, 000 results, Climate Change Education 10, 600 results, and 390 results. This shows the scope of scholarly work in this area. For this reason, we drew only on systematic reviews conducted from 2016 onwards, and the perspectives may also be limited as a result and should therefore be viewed as indicative only.



environmental attitudes, values, and knowledge, as well as builds skills that prepare individuals and communities to collaboratively undertake positive environmental action' (**Ardoin, Bowers and Gaillard, 2020, p. 1**). Furthermore, it facilitates connections between actionable research findings and on-the-ground practices, attempting to bridge the theory-action gap. To understand this relationship, Ardoin et al. (2020) carried out a systematic review into conservation outcomes, where they identified themes in the literature to improve environmental outcomes by: 1) focusing on localized issues in conservation; 2) building multistakeholder collaborations between scientists, resource managers and local actors; 3) integrating action elements into educational programmes; and 4) being intentional, creative and thorough in measuring and reporting programme outcomes. The common thread through the four themes is the importance of 'synergistic spaces' where research findings and knowledge converge in local communities and

ecosystems (**Maas, Toomey and Loyola, 2019**). A particularly pertinent field using these themes is citizen science, which brings in members of the general public to design and implement research projects with viable and useful data (**McKinley et al., 2017**). Importantly, a limitation also highlighted in this systematic review is the English language criterion and peer-reviewed literature, whereby the authors noted that there is a wealth of research in other languages and in the grey literature, though these dimensions are more difficult to systematically review.

Exploring this limitation, Briggs et al. (2018) present a systematic review of EE in publications focused on Latin America and the Caribbean (LATAM). In contrast to EE in North America, which developed in the 1970s in formal education connecting youth to environmental issues, EE in LATAM developed in the 1980s, with influences in emancipatory, rural and popular causes (**González-Gaudiano, 2007**). Though some EE research has been conducted in Brazil and



Mexico, LATAM is poorly documented (**González-Gaudiano and Lorenzetti, 2013**). The authors of the systematic review identify large gaps in EE knowledge in LATAM,

particularly EE as it applies across cultural contexts, due in part to the exclusion of regionally important journals from accessible research databases. The authors



suggest further emphasis needs to be placed on supporting and promoting more region-focused research, as well as building partnerships between practitioners and scholars.

Whereas EE – which is a complex and richly textured research field – (Stevenson et al., 2013), is seen to be oriented towards learning facts about the environment, developing attitudes in and for the environment, and can also be associated with environmental actions and action competences,⁴ some authors see environment and sustainability education (ESE) to be placing more focus on abilities to embrace and develop a more intersectional type of ‘democratic action competence’ (Sund, Gericke and Bladh, 2020). In a systematic review of ESE, Maina-Okori, Koushik and Wilson (2018) explore the role of intersectionality to deconstruct and disrupt oppression in ESE, for example, ecofeminism, queer pedagogy, and indigenous and decolonizing

perspectives. The authors call for increased attention in ESE to include black feminist and indigenous approaches, alongside renewed attention to social justice and indigenous systems of knowledge, with a territorial understanding and focus on education.

2.5 .2 .2

CLIMATE CHANGE EDUCATION

In light of the climate change emergency, there has been a recent growth in the number of CCE publications, adopting a variety of educational strategies. In a systematic review, Monroe et al. (2019) present strategies for both formal and non-formal settings. The authors note the difficulties arising from different conceptions of CCE, both with respect to presenting ‘the facts’ and to addressing climate action and politics. The authors highlight the need to discuss public engagement

...call for increased attention in ESE to include black feminist and indigenous approaches, alongside renewed attention to social justice and indigenous systems of knowledge, with a territorial understanding and focus on education.

⁴Note that this is by necessity a simplification of a complex, oftentimes politically charged and transformatively oriented field of educational research and practice (cf. Stevenson et al., 2013).

... highlight the need to discuss public engagement simultaneously at different levels (Wibeck, 2014), as well as to address beliefs and attitudes to climate change through place-based education (WG3-ch7)

simultaneously at different levels (Wibeck, 2014), as well as to address beliefs and attitudes to climate change through place-based education (WG3-ch7), whereby students directly experience climate change disruptions that can affect their perception of, and opinions on, climate change (Brownlee, Powell and Hallo, 2013). In another systematic review of CCE, focusing on children and young people, Rousell and Cutter-Mackenzie-Knowles (2020) note that more participatory, interdisciplinary, creative and affect-driven approaches to CCE are needed. Specifically, they stress a need for CCE to engage with broader social movements addressing climate change, and, citing Brownlee, Powell and Hallo (2013), to move beyond cognitive and scientific knowledge-based approaches so as to engage with affective dimensions, especially research that 'gives young people both a hand and a voice in redressing the complex implications of climate change in their own communities and environments' (Rousell and Cutter-Mackenzie-Knowles, 2020, p. 203).

Reviews have also noted a trend for increasing research into climate change education policy (e.g. Bangay and Blum, 2010), as well as a need for greater research attention to critical policy theory and methodology and issues of intersectionality (Aikens, McKenzie and Vaughter, 2016). In line with the limitations in EE research, the authors identify the under-representation of published policy research across Africa, South and Central America, Eastern Europe, and North and West Asia, as well as the exclusion of local-scale policy research due to factors including the dominance of Western academic publishing networks and marginalization of languages other than English (Aikens, McKenzie and Vaughter, 2016). All this suggests that there is a need for a greater attention to local contexts and closer attention to the messier aspects of policy enactments (Braun et al., 2011).



2.5 .2 .3

EDUCATION FOR SUSTAINABLE DEVELOPMENT

Research interest in ESD has, like EE and CCE, increased considerably over the years, with increasing collaboration of authors worldwide (**Grosseck, Tíru and Bran, 2019**). In a systematic review of ESD in early childhood education (ECE), Bascopé et al. (**2019**) note the importance of: 1) action-oriented and participatory research that promotes local change agents; 2) the requirement of ECE to be a community-based process, with education understood as a localized social process; and 3) being value-oriented, since our civilizational crisis requires a radical transformation in how we relate to one another and to non-human life. The authors suggest appropriate pedagogical approaches such as arts-based methods, outdoor education and project- and problem-based learning.

... appropriate
pedagogical
approaches such as
arts-based methods,
outdoor education and
project- and problem-
based learning.

A core aspect of ESD is to educate individuals and societies to live more harmoniously with nature and face up to the immense challenges confronting humanity. As a means to address structural obstacles to sustainability, there is an important transformative aspect to EE, CCE and ESD, requiring deep reflection and shifts in beliefs and value-systems towards more socio-ecologically just futures. This requires learning methods that allow for the development of competencies that go beyond cognitive and ‘knowing’ aspects, to include socio-emotional and ‘being’ competences (**Gómez-Olmedo, Valor and Carrero, 2020**). A systematic review of mindfulness in ESD highlights that mindfulness practices can help nurture socio-emotional competencies (**WG1-ch3; WG2-ch5; WG3-ch4**), and that in addition to adapting mindfulness to the specific outcome desired, it is necessary to fit interventions to specific contextual socio-environmental challenges (**Gómez-Olmedo, Valor and Carrero, 2020**). A review paper also focusing on mind-in-society, but on the social

Lessons from research, consultations, piloting of materials, demonstration projects and capacity-building workshops will need to be transferred into ESD policy and practice on a wide scale.

formation of mind through socio-cultural learning, which captures insights across a number of cases and contexts in Africa, argues for collective forms of expansive learning in sociocultural contexts for transgressing normalized unsustainable practices (**Lotz-Sisitka et al., 2017a**). The paper argues for the sociocultural co-construction of meaning and transformative praxis through expansive learning in the cultural historical activity theory tradition, which has a long history of indicating how collective learning and transformed human activity emerges from multi-actor formations in response to challenges and contradictions in society (*cf. Engeström, 2015*).

HE has also been connected to ESD and there is an independent subfield called higher education for sustainable development (HESD). An early focus (**2005, 2009**) on environment protection, environmental science education and environmental engineering education (**Jim and Shen, 2016**) has evolved into a more diverse focus on learning, pedagogy and

community outreach between 2009 and 2014 (e.g. **Wals, 2014**). Jim and Shen (**2016**) also note that there was a mismatch between the UNESCO aims for the UNEDSD and ESD research, with a particular dearth of research from sociocultural perspectives, such as research on gender equality and human rights.

Given the global scale of the response needed to address sustainability challenges, the final UNEDSD report (**UNESCO, 2014b**) highlights the importance of scaling up action through ESD policy and action. However, there is an appreciation of the complexities of ESD, centred around the need for education to be contextualized (**UNESCO, 2014b, p. 180**). What works in scaling up ESD across a local school district in Colombia, for example, may be quite different from what will be needed to scale up systems across Finland. Lessons from research, consultations, piloting of materials, demonstration projects and capacity-building workshops will need to be transferred into ESD policy and practice on a wide



... dominant forms of modernity and coloniality underpin the unsustainability of the established model of ‘development’ and associated forms of education.

scale, but there will be cases where initiatives work best because they are very local in context and only manageable as small interventions.

2.5 .3

TOWARDS TRANSFORMATIVE EDUCATION FOR SUSTAINABLE DEVELOPMENT

Current views on sustainability development focus on working towards major societal transformations (**Bostrom et al., 2018**), through holistic and transformational learning and intergenerational sustainability, to preserve common intergenerational resource pools (**Aoki et al., 2020**). Although the broader aim of ESD is ‘positive societal transformation’ (**UNESCO, 2014a, p. 12**), a full transformation of education systems has yet to take place. As discussed in **section 2.4**, dominant forms of modernity

and coloniality underpin the unsustainability of the established model of ‘development’ and associated forms of education. Efforts to transform education for sustainability can therefore be meaningfully linked to decolonial efforts to de-centre modern systems of knowledge that have led to the denigration and disavowal of other systems of knowing and being and the devastation of nature. Increasing understanding of sustainability challenges (scientific literacy) and engaging psycho-social and action dimensions are necessary for personal and political change. At the same time, addressing the crisis discussed in **section 2.2** requires going beyond awareness raising and behavioural change interventions to rethinking how we have been constituted as individuals, and how our social norms and cultural practices are formed. We must consider how to escape the trap of twentieth century individualization in and through education, and instead realize a socially framed paradigm that recognizes the individual-in-society and environment (i.e.

Understanding of the role of positive emotion in promoting human flourishing and sustainable development has prompted calls for integrating social and emotional learning into ESD.

collective action, social learning and social change approaches in education) that also foreground social justice, the common good and include the more-than-human (*Lotz-Sisitka, 2017*).

There is an emerging effort by environmental scientists, neuroscientists, psychologists and educators to come together and combine neuroscientific and psychological insights with the analysis of the broader societal framework for sustainable development, in an effort to create a holistic perspective for ESD programmes (*Ojala, 2019; Aoki et al., 2020; Luetz, Margus and Prickett, 2020*). Understanding of the role of positive emotion in promoting human flourishing and sustainable development has prompted calls for integrating social and emotional learning (SEL) into ESD (**UNESCO MGIEP, 2020(WG3-ch4)**). Such calls envisage the addition of an emotional dimension to the ESD framework including: 1) developing capacities for emotional articulation and regulation (*O'Brien and Sygna, 2013; Ojala, 2013*); and 2) integrating social, affective

and cognitive dimensions of ESD at the individual level with an understanding of the importance of inclusiveness, social relationships, institutions and politics (**Boström et al., 2018**). Understanding the neural basis of persistent behaviour change and prosocial motivation both from the perspective of ‘individual cognition’ and of a ‘social learning paradigm’ (*Luetz, Margus and Prickett, 2020, Figure 2*) is increasingly seen as important to informing the ESD frameworks of the future. There is also a strong body of research emerging in the cultural psychological arena that does not reduce the mind to brain, but recognizes the cultural historical and social origins and dynamics of human learning (*Engeström, 2015; Stetsenko, 2018*). This research couples transformative, transgressive learning with an expansive process of co-creating transformed human activity. This emerges from our capabilities to use language, work with tools and artefacts that are culturally co-created, and think and exercise volitional will (i.e. capability to choose with reason), in relation



Education – including formal schooling, training, public awareness and public participation – is considered fundamental to overcoming denial and anxiety, increasing climate literacy and supporting the climate action we need.

to others and conflicting stimuli in society. This research as it is emerging in the context of sustainability and social justice, focus particularly on collective social learning and transformative agency formation, with proven non-instrumental outcomes at the level of transformed human activity (e.g. Engeström and Sannino, 2021; Sannino, 2022; Lotz-Sisitka et al., 2017a). There are also attempts to integrate the teaching of STEM (science, technology, engineering and maths) with culturally relevant place-based exploratory approaches in indigenous communities (Roehrig et al., 2012; Kern et al., 2015; Lotz-Sisitka et al., 2017b). Such approaches respect the connections that indigenous communities have with the natural environment yet allow indigenous learners to value scientific inquiries about the world, offering a wider scope of knowledges (i.e. an ecology of knowledges) for meaning-making (for further discussion, see WG3-ch4).

Education – including formal schooling, training, public awareness and public participation

– is considered fundamental to overcoming denial and anxiety, increasing climate literacy and supporting the climate action we need. However, enacting a model of sustainable development is not simply about furthering ‘pro-environmental behaviour’ and informing ESD with evidence from neural and behavioural sciences. ESD, properly understood, is not just a learning intervention but ultimately a vision of the kinds of societies that are both served by, and enable, a more holistic vision of education. An excessive or unbalanced focus on behavioural change through education can potentially distract from the urgent need for transformative social change. From an educational system development perspective, there is a fundamental need to shift away from learning-to-understand towards learning-how-to-act-and-transform (Schnitzler, 2019). Kagawa and Selby (2010) go a step further by stating the need for a lived paradigm shift in addressing climate change, whereby education can only address global dysfunction if it addresses its root

causes (**Lotz-Sisitka et al., 2015**). This requires interdisciplinary and multidisciplinary frames and multi-actor engagement at local and global levels, a social and holistic learning process and appreciation that climate justice is fundamental for ethical and responsive CCE (**Reid, 2019**). It also, crucially, requires that attempts to transform pedagogy, curricula and educational institutions in ways conducive to sustainable lifestyles are matched by appropriate steps to transform the contexts in which education systems operate. As we emphasize in the work of this working group, without far-reaching reforms to political institutions, labour markets and welfare systems to dampen the competitive dynamic, promote security and enhance human dignity and agency, educational initiatives alone are likely to be inadequate. Importantly, educational initiatives should not be reductionist in their scope and conception; if anything education should be conceptualized as

individual involvement in social engagement and co-learning to transform human agency and collective cultures and activity.

Contextual influences articulated by the sustainability sciences on education are broad, ranging from shifting demographics and geopolitical changes. Importantly, there is a need to learn from historical mistakes in education and training systems worldwide (e.g. to avoid linear thinking in the colonial image), so as not to reproduce outdated approaches to capacity building and education and training system development. Due to a strong and enduring emphasis on education for human capital development and economic growth, mainstream discourse and public policy on education have a long distance to travel toward a ‘common good’ paradigm (**on Asian policies and curricula, see UNESCO MGIEP, 2017**).



2.6

Key messages and implications

Running through this chapter (and subsequent chapters) is the argument that reconfiguring education to meet the challenges of sustainability involves far more than a process of ‘scientifically’-informed technical adjustment. In

planetary and human terms, our dominant educational paradigm is profoundly toxic, and meeting the challenge of educational ‘detoxification’ requires first understanding, or reimagining, the fundamental aims, purposes

and potential power of education as a transformative force. While scientific insight and technological innovation may contribute to rendering certain educational practices more sustainable, a more radical and thorough project of transformative cultural critique and ethical reflection is therefore urgently needed. While EE, CCE, ESE and ESD are essential, in this respect, for raising awareness of our predicament, this emerging body of transformative educational research and praxis, is insufficient by itself to bring about the transformation in our relationships with each other and with nature that is vital to staving off the worst effects of environmental crisis. The following are our five key findings and recommendations:

- ***Education has the potential to transform behaviour and practices***, and to facilitate social, economic and institutional changes necessary to ameliorate counter climate-related threats. Its capacity to do so, however, depends largely on how rapidly and effectively we can also address macro-contextual factors

such as political oppression, chronic economic insecurity and inequality, as well as the underlying epistemic assumptions that inform our beliefs about education and its role in our social order.

- ***The important positive contribution that education can make in raising awareness, fostering empathy*** (for each other and for nature) and promoting active, engaged citizenship may be diminished if opportunities to exercise agency are frustrated, and if governments and corporations continue to treat humans instrumentally as ‘resources’ for perpetual expansion and unsustainable consumerism.

- ***Fostering critical awareness of histories of colonialism, violence, ecological exploitation, and intolerance***, and their role in the construction of our present unsustainable political, social and economic order, is important for underpinning efforts to promote a more sustainable, inclusive and humane approach, that also takes the more than human fully



into account in the context of overall planetary well-being and sustainability.

- While emphasizing the need for critical awareness of the pernicious legacies of colonialism

and associated patterns of thought, we must beware of appearing to subscribe to crude ‘anti-Westernism’. Rather than simplistically dividing humanity into ‘oppressed’ and ‘oppressing’ groups, or promoting civilizational stereotypes, education should reinforce awareness of our common humanity and shared responsibility to address a global crisis for which we are all jointly, if unequally, to blame.

- While enhancing awareness (through education), alongside psychological and behavioural and social change interventions,

is necessary to motivate pro-environmental action, research suggests that it is not sufficient to achieve meaningful or lasting change in our societies or our relationship with nature. The operation of powerful vested interests that wish to deflect demands for concerted action by state and corporate actors must be taken into account – and this implies a crucial role for political action, alongside education.

Importantly too, educational initiatives should not be reductionist in their scope and conception; if anything education should be conceptualized as individual involvement in social engagement and co-learning to transform human agency and collective cultures and activity.

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C H A P T E R

3

Political economy of education – Implications for efficiency, equity and social justice

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Discussing the relationship between economics and education from a political economy perspective, this chapter focuses on the mediating factors of state structure, legal frameworks and culture, political and religious ideologies, class, ethnicity and gender. This contextual approach to the relationship between economics and education underpins the key argument that investing in human capital is necessary but not sufficient to make education a force for societal progress and human flourishing. The chapter considers the aspects of educational investment and financing that policy-makers should incorporate into their decision-making, and their implications for social equity. The chapter examines two recent trends in educational governance – meritocracy and marketization and privatization.

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3.1

Introduction

In 2014, Thomas Piketty's book, *Capital in the 21st century*, became a global sensation by highlighting the apparently inexorable rise in economic inequality within and between nations. In his book, Piketty (2014) refutes the claim that, in the long run, industrialization and economic growth will reduce inequality. Instead, he shows that, apart from a short period between 1914 and 1950, when most of the world was devastated by economic depression and war, inequality had been steadily rising since the onset of industrialization, and it now approached levels comparable to those of the early nineteenth century.

According to Piketty, one key to reversing this bleak trend was education. By investing more in

education, governments could raise the supply and quality of skills in their populations, which would in turn reduce income inequality. Piketty thereby reiterated one of the noblest and most important ideas of modernity – that education is key to creating more equitable, just and flourishing societies. However, critics soon pointed out that things might be more complicated. Specifically, some educational researchers criticized Piketty's reliance on a human capital perspective on education, arguing that human capital thinking had itself informed a large number of educational reforms, which had been instrumental in exacerbating the very inequalities criticized by Piketty himself (Dale, 2016; Robertson, 2016; Klees, 2017).



... over the last few decades, patterns of access to and financing of education have been deeply involved in exacerbating the social and economic disparities we witness today.

However, in his recent book, *Capital and Ideology* (2020), Piketty is more nuanced in his view of education. He shows that, over the last few decades, patterns of access to and financing of education have been deeply involved in exacerbating the social and economic disparities we witness today. In this sense, education has become a means for defending privilege as much as a means for overcoming privilege. Here higher education (HE) plays a crucial role. To make this point, Piketty (2020, p. 710) quotes an 1872 statement by a French educationist:

Obliged to submit to the law of the majority, the classes that call themselves superior can preserve their political hegemony only by invoking the law of the most capable. Because the walls of their prerogative and tradition are crumbling, the democratic tide must be held back by a second rampart made up of brilliant and useful merits, of superiority whose prestige commands obedience, of capacities of which it would be folly for society to deprive itself.

What this unapologetic statement makes clear is that in a democratic society, education does not only serve equality. It also contributes to promoting inequality beneath a veneer of justice.

These examples point to the complexity of the relationship between economics and education. In accordance with the UNESCO mandate, in this chapter we explore how education may contribute to more equal and socially just societies. In order to do so, however, we need to understand the manifold and ambiguous ways in which economics and education interact in different geographical, cultural and political settings. It also means that we must explore how education may, in some contexts, contribute to the reproduction of inequality and even to the creation of new inequalities. In other words, in order to imagine how education can be a part of the solution, we must also realize how it can be a part of the problem.



3.2

A Political Economy

In order to unravel the complexities of the interplay between economics and education, we adopt a political economy approach. The term ‘political economy’ dates back to the eighteenth century but remains contested. Today, there are widely different versions of

political economy, including Marxist approaches to public choice theory (Klees, 2017). In this chapter, we use the term in a broad sense – implying that economic processes and outcomes are embedded within social relations in the widest sense of the term. The relationship between



'Political economy...' resonates profoundly with the notion of 'context' to the extent that it provides a contextually informed approach to the relationship between economics and education.

education and economics is not a direct one. It is mediated by state structures and legal frameworks, by culture as well as political and religious ideologies, and by social relations of class, ethnicity and gender. 'Political economy', as employed here, resonates profoundly with the notion of 'context' to the extent that it provides a contextually informed approach to the relationship between economics and education. This also implies that the 'political economy' indicates an interdisciplinary approach to education and economics. In this chapter, we draw especially on studies from political science and sociology in addition to the 'economics of education'. In addition, a political economy approach to context also implies a comparative perspective on the relationship. The relationship between education and economics is mediated by very different political and institutional arrangements and patterns of social relations. Therefore, it is articulated in very different ways in different settings. In this respect, this chapter

draws especially on research in comparative education – the field of educational research that specializes in developing and assessing comparative approaches to educational processes, including the relationship between education and economics.

Finally, it should be noted that 'political economy', as employed here, implies an inescapable evaluative or even moral dimension. At the same time, it aims to be unbiased (not subject to special interests, ideological or otherwise) although it does not purport to be value-free. It is well known that Adam Smith, one of the founders of the tradition of political economy, was not an economist in the modern sense of the word, but a moral philosopher. According to Smith (1776, 1970), and to much of the tradition that he was instrumental in founding, the most fundamental question of political economy does not concern economic efficiency per se, but rather how economic processes may serve to advance the social good – that is, the well-being of society as a whole.



3.3

Methodology: evidence and context

Given the scope of this chapter, we must necessarily draw on a wide and varied range of scientific evidence. In general, the social sciences are characterized by considering information of a composite nature (quantitative and qualitative data) and employing a wide variety of research approaches to analyse the data, ranging from those closest to positivist and post-positivist to critical, interpretivist and

humanistic (**Della Porta and Keating, 2008**).

This point is especially pertinent from a political economy perspective. As it implies an interdisciplinary approach, it necessarily takes into consideration not only different sources but also different conceptions of evidence. In order to assess the complex interplay between economics and education, this chapter will need



Even the (apparently) simplest of relationships are mediated in ways that make context crucial for final outcomes.

to cover research questions at a number of different levels – from more straightforward questions associated with the impact of certain models of educational financing on the enrolment of students in HE, to broader questions concerning the ways in which neoliberal policy trends condition the changing roles of public and private education providers in different contexts. While quantitative data (e.g. educational statistics) are crucial to answering the first kind of question, answering the second kind of question requires evidence of a different nature, including critical policy studies. In the latter case (and as emphasized by the interpretivist tradition in the social sciences), it becomes obvious that researchers' perceptions are an inescapable part of the analysis and its results. Since this is an inevitable condition, it does not detract from the scientific validity of such studies. It means, however, that we have to 'control' for potential bias by including a broad range of studies in our assessment, rather than basing our conclusions on the findings of a single author.

Finally, in a chapter appearing under the heading 'Context', it should not be forgotten that contextual information is in itself a crucial form of evidence. In educational research (and, indeed, in the social sciences more generally), we are rarely dealing with direct causality (**Hammersley, 2003**). Even the (apparently) simplest of relationships are mediated in ways that make context crucial for final outcomes. In order for this assessment of economics and education to serve as a reliable source of evidence for policy-makers and practitioners, we will therefore have to be highly sensitive to this contextual mediation. For this purpose, we also include case studies in our assessment. While such studies are often dismissed as inferior (or 'anecdotal') sources of evidence, we argue that for our purposes they serve an important role, not just in demonstrating how economics and education interact in specific settings, but also in strengthening our general understanding of the contextual mediation of the relationship between economics and education.



3.4

The structure and argument of the chapter

The chapter's main argument is that investing in human capital

is necessary but not sufficient to make education a force for societal



In some contexts, marketization and privatization may serve to strengthen the provision and organization of education.

progress and human flourishing. The social outcomes of educational investment depend on the modes and distributional patterns of such investment. Therefore, we need to look closely at the specific ways in which human capital is cultivated and valued under the aegis of different education policy and financing regimes to assess the implications of educational investment for social equity and human flourishing.

Our examination of these issues is divided into two parts. Firstly, we focus on two recent trends in education governance that have significant, albeit ambivalent, implications for social equity and human flourishing. The first of these is meritocracy, and the second is marketization and privatization. Following authors like Markovits (2019) and Sandel (2020), we argue that while meritocracy has traditionally been considered a ‘leveller’ (since it insists that educational opportunities should be equally open to everyone), it increasingly creates large disparities of income

as well as social esteem between different forms of education and jobs. In this respect, the increasing role of education as an arbiter of social relations of power and status may have deleterious consequences for social equality as well as for human flourishing.

Similarly, ambivalent effects are associated with marketization and privatization. While marketization refers especially to new forms of educational governance ('quasi-markets') that claim to make educational organizations more efficient, responsive and innovative by exposing them to market pressure, privatization refers specifically to the multiple ways in which the private education industry increasingly participates in and re-shapes education around the world. In some contexts, marketization and privatization may serve to strengthen the provision and organization of education. They may create more flexible modes of educational provision, thus creating new opportunities for groups traditionally marginalized in

... marketization and privatization are often associated with an impoverished conception of education.

public education systems. In many cases, however, marketization and privatization reinforce disparities between educational institutions and the different social groups they serve. In some cases, they directly compound the inequalities associated with meritocratic sorting. One case in point is the worldwide increase in the use of private tutoring as a strategy for obtaining admission to prestigious educational institutions. Furthermore, marketization and privatization are often associated with an impoverished conception of education. Here, education is frequently understood in narrowly instrumentalist terms as a matter of developing the competencies required by contemporary labour markets. While this role of education is highly important (and also deficient in the majority of contemporary education systems), it simultaneously seems to ignore the importance of ‘public spiritedness’ in all its forms as an equally constitutive aspect of education.

The second part of the chapter discusses in more detail how such trends of educational governance affect patterns of investment in and financing of education systems around the world. We note that even if government expenditure on education in most low-income and lower-middle-income countries has risen, more is needed in order to meet commonly accepted international benchmarks. Just as importantly, we note that expenditure on education is increasingly allocated to post-secondary education rather than to primary and secondary education. This applies not only to domestic expenditure but also to external aid, which has stagnated in recent years.

This trend is consistent with the premises of meritocracy, which put a premium on HE credentials in social advancement. However, it is important to consider the ways in which investment is made in HE; to the extent that this investment competes with investment in secondary and (especially) primary education, its effect would not



We note that even if government expenditure on education in most low-income and lower-middle-income countries has risen, more is needed in order to meet commonly accepted international benchmarks.

contribute to greater social equality. Another element to bear in mind is that increased access to HE does not necessarily benefit the students themselves – neither in terms of skills formation, nor in terms of human flourishing. Discussing the cases of HE in Africa and Latin America, we show how rapid expansion of post-secondary education may lead to serious problems of under-funding, poor quality and high rates of attrition. This affects economic growth as the skill levels and profiles of graduates may not meet the requirements of contemporary labour markets. However, it also negatively affects human flourishing. As students realize that prospective employers do not value their credentials, legitimate aspirations for better lives through education are frustrated with deleterious

consequences for citizenship and social cohesion.

The chapter consists of two types of text. The main text aims to provide an overview of the most important issues raised by the relationship between education and economics, and it is therefore written in relatively general terms. This text is supplemented by text boxes, which discuss relevant issues of the chapter in more localized terms. The use of text boxes aims to provide the chapter's general discussions with the kind of contextual detail and complexity that befits a chapter contributing to exploring the importance of 'context' in education.



3.5

Education as a public and private good

One reason why education is a chronically contentious issue is that it functions simultaneously as a public and a private good. As suggested by Labaree (1997), at least three different social functions of education can

be distinguished. The first is 'democratic equality' – preparing students to act as enlightened and responsible citizens of a democratic society. The second is 'social efficiency' – equipping students with qualifications





... social efficiency is inherently inegalitarian. It consists of allocating individuals to differential positions in a stratified social order.

that will make them productive members of the workforce. In both cases, education serves as a public good. It serves the public interest – understood variously as the political order or the market order. However, while democratic equality is egalitarian in nature, social efficiency is inherently inegalitarian. It consists of allocating individuals to differential positions in a stratified social order. In this respect it is related to the third function of education, which allows education to be appropriated as a private good. As machines of selection, education systems produce ‘positional goods’ (Hirsch, 1976) for which individual students compete and which can be converted into social and economic advantage.

While Labaree’s (1997) conceptualization of the functions of education is in many ways an extrapolation of the history of American education, its relevance is much broader. Thus, it remains highly pertinent for understanding the role of education in today’s global context. However, the content of each of these functions,

as well as their relative importance, has changed markedly. In many countries (e.g. European (EU) countries) the universalist political ideal of ‘education for democracy’ has partially been supplanted by the more particularistic ideal of ‘education for national coherence’. Similarly, the OECD-instigated discourse on ‘the knowledge economy’ (OECD, 1996) has re-fashioned the ‘social efficiency’ argument. As most states have come to consider education a crucial determinant of national economic competitiveness, it now becomes a matter of urgent state concern to ensure that education is organized in such a way as to optimize the competitive position of the nation as a whole. In this respect, the ‘public’ function of education as human capital formation on a national and global scale remains of crucial importance. Arguably, however, the most important change is the increasing importance of education as a private good. This applies to the producer side where private actors – commercial as well as philanthropic – not only serve as educational suppliers but also

... meritocracy remains more important than ever in the sense that many education systems continue to exclude and marginalize segments of their populations based on factors such as social origin, gender, ethnicity and sexuality.

actively participate in setting the terms of educational policy (Ball and Youdell, 2008). At the same time, it also applies to the consumer side as students are increasingly enjoined to view education in economic terms – as an investment in individual human capital on which they should seek the maximum return. While this development is most evident in commercialized education systems, it can also be observed in less commercialized systems like Nordic ones where tuition remains free even at the tertiary level.

In the following sections, we examine these developments in more detail. We start out with the consumer side, focusing on the discourse of ‘meritocracy’ in which the promotion of education as a private good is shrouded. Subsequently, we turn to the producer side in order to highlight how education has been reorganized and repurposed to allow for much more active private participation in educational provision, administration and policy-making.

3.5 .1

THE DISCONTENT WITH MERITOCRACY

Meritocracy is one of the most influential educational and social ideals of modernity. It claims that social opportunities and economic rewards should be distributed solely on the basis of individual achievement. Ability and effort should decide the life chances of each person – not ‘extraneous’ factors such as social origin, gender, ethnicity or sexual orientation.

The principle of meritocracy has played a highly important role in creating avenues for social mobility and breaking monopolies of traditionally dominant groups on positions of social power and prestige. Furthermore, meritocracy remains more important than ever in the sense that many education systems continue to exclude and marginalize segments of their populations based on factors such as social origin, gender, ethnicity and sexuality.



However, as systems of meritocratic allocation of life chances have evolved, it has become increasingly clear that there is also a darker side to the principle of meritocracy. As indicated, meritocracy is at odds with the democratic mission of education – that of creating autonomous and equal citizens. Meritocracy not only accepts that equality of opportunity will lead to inequality of outcomes. Nestled within a hierarchical conception of education and the social order more generally, it actively aims to produce unequal outcomes. However, even considered in its own terms – replacing a fixed social order with a dynamic, ‘socially mobile’ one in which there is no inherent relation between starting positions and final outcomes – meritocracy has become increasingly deficient.

... meritocracy is at odds with the democratic mission of education – that of creating autonomous and equal citizens.

In one sense, the discontent with meritocracy should come as no surprise. When Young (1958) coined the word ‘meritocracy’, he considered it to be a negative phenomenon. The author was therefore appalled when, shortly

before coming to power in 1997, Tony Blair stated that ‘New Labour is committed to meritocracy’ (Sandel, 2020, p. 66). Young (1958), Markovits (2019), and Sandel (2020) point out two main problems with making meritocracy the principle of educational and social justice. The first is that, in crucial respects, meritocracy has not delivered on its promises. Meritocracy promised to put an end to a social and educational regime based on stratification. In contrast to the hereditary privileges of an aristocratic or class-based society, meritocracy set out to create a dynamic society where positions of social and educational advantage could not be inherited, but would have to be won by each generation, and each individual, through their own abilities and hard work.

As shown by Markovits (2019) and Sandel (2020), however, this opposition between ‘hereditary privilege’ and ‘meritocracy’ has proven false. According to meritocratic principles, in almost all societies that allocate

Over the last fifty years, income disparities between persons with a college degree and persons without a college degree have grown significantly.

educational and social advantages, something like a ‘hereditary meritocracy’ has emerged. The problem here is not simply that meritocracy gives rise to inequality. This is not surprising since inequality of outcomes has always been as crucial to meritocracy as equality of opportunities. Rather, the problem is that such inequalities have huge intergenerational consequences. Over the last 50 years, income disparities between persons with a college degree and persons without a college degree have grown significantly. From the mid-1960s, a partner’s remuneration in an elite law firm has grown from five times to forty times a secretary’s salary (Markovits, 2019, p. 18). No less important, disparities between tertiary education institutions and the certificates they issue have also widened enormously. Credentials from top-tier, ‘world-class’ universities (especially Ivy League universities) reap enormous benefits in terms of salaries and social status while credentials from lower-tier universities only provide very small benefits or none whatsoever. Credentialism (Collins,

1979) has fuelled competition at all levels. This is especially palpable in top-tier universities where competition constantly intensifies – thus making them even more selective. In the mid-1970s, Stanford University accepted nearly a third of applicants. In 2019, it accepted less than 5 per cent (Sandel, 2020, p. 61). To be admitted to selective universities, students will spend their high school years (and, in many cases, their entire childhood) preparing intensively for the admission process (Markovits, 2019, p. 41).

If meritocracy is hereditary, this is because admission to highly prestigious educational institutions has become virtually impossible for students who have not attended elite schools and received private tutoring and expensive test preparation. Today, less than 4 per cent of Ivy League students come from the bottom fifth of the income scale (Sandel, 2020, p. 23). From the perspective of social equity, a vicious circle has formed: students who graduate from top-tier universities are picked for professional jobs, which pay several times the



amount paid to individuals with lesser credentials, or none at all. This gives them opportunities to provide their children with elite schools, private tutoring and professional admission consultants to ease their way into the same top-tier universities from which they graduated themselves. No fraud is involved here, and hereditary meritocracy is definitely not a new ‘leisure class’. As Markovits (2019, p. 87) notes, members of the meritocratic elite have to work extremely hard to retain their educational and economic privileges. However, the vast majority of contemporary populations are effectively excluded from playing the meritocratic game, no matter how hard they work.

The second problem is that meritocracy as a social ideal may be inherently flawed. In his recent book on meritocracy, Sandel (2020, p. 95) writes that ‘at a time when racism and sexism are out of favor (discredited though not eliminated), credentialism is the last acceptable prejudice’. Sandel points out that people

who achieve high credentials and the accompanying economic and social rewards are led to believe that they deserve those rewards in contrast to people who do not secure them. Equally insidious, Sandel points out, is that the disadvantaged have been socialized to have the same beliefs – even though in many cases the so-called merit of high credentials has only been possible because of differential starting points in financial and social capital.

This point was already crucial to the scathing criticism of meritocracy that Young (1958) conducted. He pointed out that in one sense the ideology of meritocracy involves a more profound form of cruelty than previous social orders. In the meritocratic game, every failure is a personal failure. In a society of entrenched class stratification, those at the bottom can claim that they have simply been unlucky to have been born in the wrong social class. In a meritocratic order, they have nobody to blame but themselves. Their failure reflects their lack of merit.

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... meritocracy generates hubris among winners, who believe they are entitled to their privileges, and resentment among losers who believe that they themselves are to blame for not succeeding.

Therefore, as Sandel (2020, p. 24) puts it, meritocracy generates hubris among winners, who believe they are entitled to their privileges, and resentment among losers who believe that they themselves are to blame for not succeeding. In this sense, meritocracy breeds attitudes that are ‘at odds with human flourishing and corrosive of the common good’ for winners and losers alike (Sandel, 2020, p. 120; cf. Markovits, 2019, p. 24). From an ethical standpoint, it is equally crippling for both groups.

However, the problem is not just ethical but also political. Young’s (1958) book (written in the form of a satirical sci-fi novel) ends in a devastating revolt against the meritocratic regime. Similarly, Sandel (2020) points out that the ways in which ideological assertions of meritocracy have developed have produced a backlash in contemporary societies. The United Kingdom (UK) provides one example, with the Brexit vote to leave the EU, and the United States (USA) provides another with the election

of Donald Trump as President. Furthermore, the global expansion of meritocracy has intensified competition and increased inequality, even in states with strong traditions in the public provision of education (e.g. Lapidus, 2019). Thus education in the future will experience continued turbulence; some societies may retain the power of credentialism and meritocracy but in others it may be diluted and even displaced.

3.5 .2

MARKETIZATION AND PRIVATIZATION OF EDUCATION

When education is seen primarily as a way to increase human capital and make economies more competitive, a marketized approach to the sector logically follows. During the last four to five decades, education systems around the world have been restructured by moves towards



During the last four to five decades, education systems around the world have been restructured by moves towards marketization and privatization.

marketization and privatization. In line with previous research (e.g. Whitty and Power, 2000), we make a distinction between marketization and privatization. We understand marketization as the reorganization of a given social domain through the introduction of market mechanisms (e.g. choice, competition). Marketization is closely related to ‘neoliberalism’ in the sense that it involves steering non-market domains through market principles in order to achieve increased efficiency and innovation. Privatization, on the other hand, implies the direct involvement of private parties in social transactions previously organized on a non-market basis. This may take the form of a transferral of property rights from the public to the private sector (e.g. privatizing postal services or railways). It may also take more ‘hidden’ forms (Ball and Youdell, 2008), like private parties providing services to the public sector. In the case of education, examples of this are consultancy services, development of curriculum material and

testing systems, in addition to a plethora of back office functions. Hidden privatization may occur as a form of covert governance where privatization can only succeed if it is kept out of public view. However, it may also occur unintentionally – for example, as a side effect of marketization processes, which create unforeseen opportunities for private companies to make themselves indispensable for the workings of public education itself. To provide one example, both aspects of hidden privatization are present in the growth of shadow education outlined below.

In the following subsections, we examine, firstly, marketization – focusing especially on quasi-markets – and then privatization – focusing especially on the global education industry (GEI). However, while marketization and privatization are conceptually distinct, they are entangled in practice. Whenever relevant, aspects of privatization will therefore appear in our treatment of marketization, and vice versa.

3.5 .2 .1

THE EMERGENCE OF MARKETIZATION AND PRIVATIZATION

Dominant philosophies on the governance of education have shifted significantly in recent decades, bringing with them changed perceptions of the related roles of the state and private sectors. The principles of the 1948 United Nations Universal Declaration of Human Rights remain generally accepted. Article 26 declares (**UN, 1948**) that:

Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available, and higher education shall be equally accessible to all on the basis of merit.

- Education shall be directed

to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance, and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace.

Parents have a prior right to choose the kind of education that shall be given to their children.

These principles have underpinned the notion that governments have the responsibility to provide free and compulsory education, at least at the basic levels, which is usually taken to mean primary and lower secondary schooling.

However, general views on the ways through which such education is provided have shifted significantly, in particular, to allow for an increased role for the private sector. Across the globe, this is widely associated with the ideology of neoliberalism (**Harvey,**

... general views on the ways through which such education is provided have shifted significantly, in particular, to allow for an increased role for the private sector



... since the 1980s, new forms of educational governance have emerged and more and more countries have introduced scope for parents to choose the school to which they send their

2005; Ward, 2014a&b; Chitpin and Portelli, 2019). Starting in such countries as the UK, New Zealand and the USA, government policy deliberately encouraged elements of marketization in public schools to improve efficiency and the expansion of the private sector alongside the public one. At the post-compulsory stages of education, especially tertiary education, this brought the introduction of fees sometimes underpinned by loan programmes that had become prominent even in the 1980s (Woodhall, 1987).

The massive expansion of education also drove changes. In 1948, primary education was far from universal around the world, and in some countries, even upper secondary education designated an elite status (Baker, 2014; Benavot and Resnick, 2006). HE was even more exclusive and accorded strong social status and employment opportunities to those who attained it. By the

second decade of the twenty-first century, this picture has changed markedly. Receiving HE is only possible by sharing costs between governments, families and other actors. The expansion seems to accord expanded opportunities that move towards equalization of opportunities, but the reality is of great stratification within systems.

3.5 .2 .2

QUASI-MARKETS IN EDUCATION

In most public education systems, students are usually assigned to the school closest to their residence. However, since the 1980s, new forms of educational governance have emerged and more and more countries have introduced scope for parents to choose the school to which they send their children.¹ The basic idea of school choice is that families, who are free to change their children's schools, exert pressure on educational

¹Even though in some places there is no school choice, there is residential choice. Research in the USA has produced evidence that parents move to neighbourhoods where schools are better and are willing to pay more for houses linked to school performance (Black, 1999); this also leads to schools' stratification.

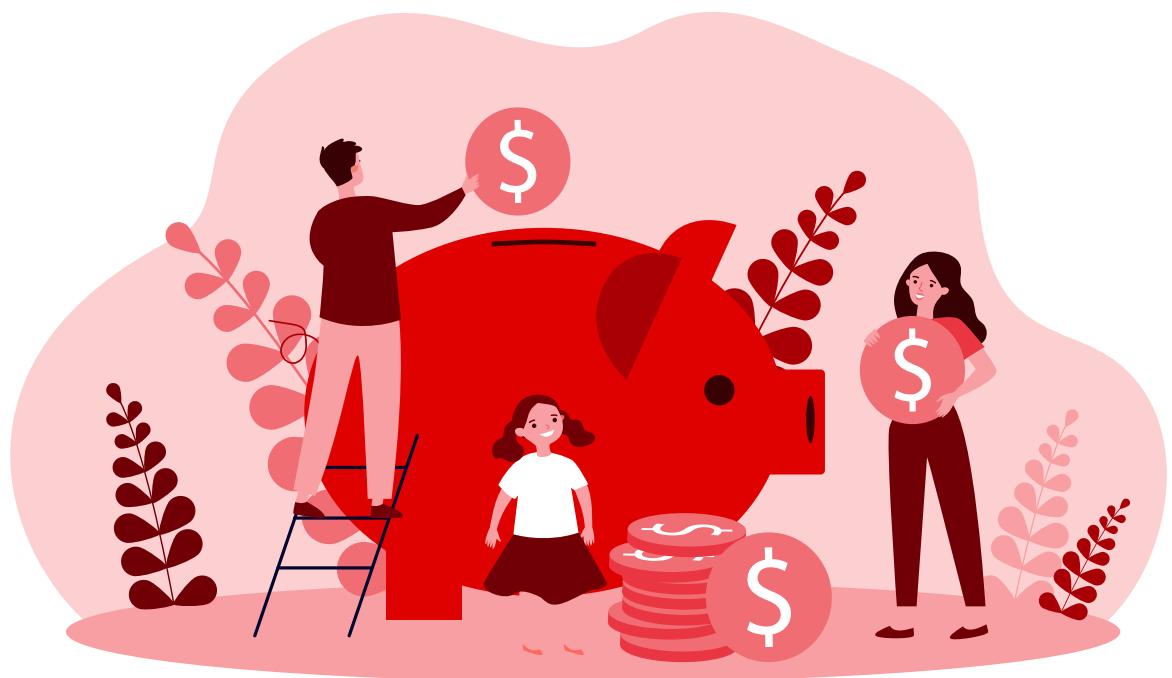
The ‘school choice’ opportunities for parents depend on the types of schools allowed to provide compulsory education and their admission requirements, which vary across countries and levels of education.

providers by creating a quasi-market that is more effective at improving the school system than the traditional control exercised by public authorities. They are called quasi-markets because public financing involves regulating the price of a school place; thus, unlike in a pure market, prices are not set as a result of the interaction of supply and demand.

The ‘school choice’ opportunities for parents depend on the types of schools allowed to provide compulsory education and their admission requirements, which vary across countries and levels of education. The range of choices often includes: public schools (controlled and managed by a public education authority), private government-subsidized schools (controlled and managed by private actors and receiving most of their funding from the government), independent private schools (controlled, managed and financed by private actors) and home-schooling (children are educated at home by parents or tutors and must meet compulsory school requirements) (OECD, 2019b).

The most relevant policies to encourage school choice are vouchers, charter schools and supply-side subsidies for private schools. Voucher programmes involve competitive financing formulas for schools in which educational spending follows school enrolment; if a student leaves the school (*exit, in Hirschman’s (1970) terminology*), the funding will go to the new chosen school. Charter schools (or ‘academies’ in the UK context) are publicly funded, privately managed schools that enjoy higher levels of pedagogic and organizational autonomy than public schools. Supply-side subsidies for private schools involve the provision of public funds to already existing private schools in the school system. They do not necessarily follow a competitive funding rationale (as is usually the case with many charter school programmes and especially with voucher schemes) (Patrinos, Barrera Osorio and Guáqueta, 2009; Verger, Moschetti and Fontdevila, 2020).

Proponents of school choice argue that competition can raise the



quality of education in public and private schools, mainly if funding is attached to enrolment, as in the voucher system. Thus, schools have financial incentives to attract and retain students by providing quality education and being more responsive to families' demands. Advocates of school choice also claim that the establishment of more autonomous schools can lead to innovations in curriculum, instruction and governance, all

of which contribute to improved outcomes (Friedman, 1962; Chubb and Moe, 1990). They also argue that the introduction of market mechanisms in education will expand the educational opportunities of the most disadvantaged students, thus enabling them to leave their low-performing neighbourhood schools for higher-performing ones (Moe, 2001; Hoxby, 2003). The assumptions behind this view

... the likely effect of school choice is segregation in the school system with potentially adverse consequences for equity in learning opportunities and educational outcomes.

are that the proper functioning of market accountability will incentivize the availability of a greater variety of educational projects, parents will have relevant information about schools, and schools will have limited ability to select their students.

Critics of school choice argue that the main assumptions of market advocates are divorced from reality (**Hening, 1994; Levin, 1998; Fiske and Ladd, 2000**). Thus, they claim that the likely effect of school choice is segregation in the school system with potentially adverse consequences for equity in learning opportunities and educational outcomes (**Epple and Romano, 1998**). There are basically three reasons behind segregation or ‘cream-skimming’ in a school choice system: (1) better-off families take better advantage of choice opportunities than poorer families (**Schneider, Teske and Marschall, 2000; Cullen, Jacob and Levitt, 2005; Bifulco and Ladd, 2007; Epple, Romano and Urquiola, 2017**); (2) schools prefer students from high-income families and/or with high ability, which is something that

triggers reverse selection dynamics, that is, many schools choose the families they want to enrol instead of the families selecting the school (**Epple and Romano, 1996, 1998; Mizala and Torche, 2012**); (3) parents choose schools with a higher socio-economic level, because they prefer to distinguish themselves with what they perceive as a ‘better’ peer group environment owing to social closure, or because they expect that a high socio-economic environment – which is usually associated with more academically able peers – has a positive effect on educational results or other outcomes (**Hsieh and Urquiola, 2006; Mizala and Urquiola, 2013**). School stratification can have long-term unintended effects on social mobility. For example, disadvantaged students may not have inspiring role models who are generally found in schools with a greater social mix. In general, social stratification between schools can threaten social cohesion, as children are not used to social or ethnic diversity.

School choice programmes can be nationwide – as in Chile,



Denmark, New Zealand, the Netherlands and Sweden – or small-scale and targeted at groups defined by geography, educational level, etc. For instance, they can be targeted at low-income students in a particular district or region. Small-scale voucher programmes (also known as targeted vouchers) can be publicly funded or privately financed. The voucher may or may not be accompanied by add-on payments; it can be flat – with all students receiving the same amount of resources – or means-tested, with the funds inversely related to a student's family income.

A number of studies have evaluated the effect of vouchers on educational outcomes. Epple, Romano and Urquiza (2017) reviewed the theoretical and empirical research on school vouchers. At the theoretical level they found that most models suggest that voucher systems have a tendency towards stratification by ability and/or income. The empirical studies suggest that being awarded a voucher has a statistically non-significant effect

on educational achievement. But, at the same time, there is evidence that in some cases, or for some subgroups of students, or specific outcomes, vouchers can have a statistically significant positive effect on those who use them. They conclude by arguing the need to continue researching this subject, refining the methodologies to obtain robust results. They also suggest that the adverse effect of vouchers can be mitigated by appropriate policy design.

Latin America has significant private sector participation in education (Verger, Moschetti and Fontdevila, 2018); however, until recently there was little information on school choice policies implemented by the different countries. Elacqua, Iribarren and Santos (2018) aimed to fill this gap by examining private school trends in Latin America; they also reviewed the policies adopted to strengthen mixed schooling systems. A contrasting case is Chile, where a nationwide school voucher programme was introduced in

**School stratification
can have long-term
unintended effects on
social mobility.**

1981 by the military dictatorship, an experience that generated substantial research by both national and international scholars (see text box 1). Private education, often government-subsidized, is growing across middle-income and low-income countries; one case that deserves some comment is India, where for some years the benefits of private schools for the poor have been widely touted (see text box 2).

Given the observed consequences of vouchers, but also of other forms of quasi-markets in education, some countries have reformed their systems and regulated private provision more strictly. The intention has been to limit the adverse effects related to stratification and inequalities in educational opportunities and, at the same time, preserve the positive effects that choice can have on other outcomes. Some countries have introduced funding formulas that account for student background characteristics – for example, the Netherlands and Chile provide schools with a higher per-pupil subsidy for

disadvantaged children (Bearse, Glomm and Ravikumar, 2000; Mizala and Torche, 2017). To prevent selection of students by schools, several education systems have introduced centralized admission systems where a government agency processes school preferences declared by families and assigns schools based on priorities defined by law (e.g. Amsterdam, Belgium, Chile, New York City, New Orleans, Boston) (Abdulkadiroglu, Agarwal and Pathak, 2017). They have also banned add-on fees to prevent social stratification within schools by family wealth and have excluded for-profit schools as eligible providers (Chile, Sweden) (Cummings, Mizala, and Schneider, 2021; West, 2017). The latter measure was adopted after it was found that for-profit schools were more likely to select students on the basis of academic and social characteristics, but also because there is increasingly widespread discomfort with the idea of channelling public funds into private profit. Finally, school choice systems have also introduced minimum quality standards and increased their

Private education, often government-subsidized, is growing across middle-income and low-income countries.



...charter schools have a higher proportion of African-American and Hispanic students than public schools.

capacity to monitor and assess the quality of school provision, both public and private (Chile, most states in the USA, the UK and the Netherlands) (**Elacqua, Iribarren and Santos, 2018**).

A charter school is a public school managed by the private sector under the auspices of a state government. Charter schools started in the early 1990s in the USA; today, they serve roughly 5 per cent of public school students there. They are mainly located in urban areas, and their prevalence varies across states and districts. Charter laws also vary across states, but all charter schools have the following characteristics: (1) they cannot charge tuition; and (2) they cannot impose admission requirements, and, if oversubscribed, must select from their applicants by lottery (**Epple, Romano and Zimmer, 2016**).

Epple, Romano and Zimmer (2016) review the evidence on charter schools. They conclude that charter schools have a higher proportion of African-American and Hispanic students than

public schools. But, they do have proportionally fewer students with special needs than public schools. The effectiveness of charter schools is not uniform. Overall evidence suggests that, considering the differences in populations served, charter schools are not, on average, producing improvements in student achievement compared to public schools. As always, this average hides the fact that many charter schools outperform the public school average and vice versa.

Verger and Moschetti (2017) analyse the academic literature (up to 2015) on school choice, considering vouchers, charter schools and other school choice programmes. In general, the results tend to be more negative than positive, especially in terms of educational inequalities, inclusion and school segregation. They also found negative effects in terms of teacher satisfaction, accountability, and students' non-cognitive outcomes and skills. With regard to families' satisfaction and engagement, school choice seems to perform

... policies that are less conducive to market competition and/or that follow an affirmative action rationale, such as targeted vouchers, are more likely to yield more positive effects on learning outcomes without necessarily undermining equity.

better. Nonetheless, it is inadequate to draw universal conclusions, as the effects of voucher programmes and charter schools may vary depending on policy design variables and the context in which they are applied. Specifically, they show that more deregulated and market-like voucher and charter school programmes exacerbate school segregation and educational inequalities.

On the other hand, policies that are less conducive to market competition and/or that follow an affirmative action rationale, such as targeted vouchers, are more likely to yield more positive effects on learning outcomes without necessarily undermining equity (**Verger, Moschetti and Fontdevila, 2020**). Darling-Hammond and Montgomery (**2008**) arrive at a similar conclusion in relation to the heterogeneous results of charter schools in the USA. In places where market competition is seen as the main way to improve the quality of education, the charter school authorization system is lax, there are more

lower-quality schools with parent and teacher participation and, consequently, with a lower level of monitoring and accountability. However, when the charter school option is seen as a way to promote participation and innovation, charter schools' authorization depends on local governments, with higher participation of parents and teachers, greater degrees of public scrutiny and responsibility, and better educational outcomes compared to public schools.

In sum, the effects of voucher programmes and charter schools vary depending on context and policy design, including government regulatory capacity and the nature of the incentives available to the private actors. However, the evidence shows that quasi-markets introduce a wide range of challenges in relation to educational equity, socio-economic segregation, school segmentation and public accountability (**Eppe, Romano and Urquiola, 2017; Verger and Moschetti, 2017**).



BOX 1: THE CHILEAN SCHOOL CHOICE SYSTEM

In the early 1980s, the military dictatorship undertook sweeping reforms in many Chilean markets. In education, a country-wide school choice system was implemented, transferring public schools to municipal governments. The government paid a flat per-student subsidy to all schools – public and private – that is, they did not charge tuition fees and students could attend the public, private-voucher or private-independent school of their choice. In contrast to US voucher systems, whereby the subsidy is given to the family, in the Chilean case, funds are allocated directly to the school selected by the family, a system known as ‘funds follow the student’. As a side-effect of this marketization process, the universal voucher system paved the way for private sector participation as a provider of publicly financed education. As a result, the proportion of school-age children attending

public schools declined from 78 per cent in 1981 to 37 per cent in 2014, and those attending private-voucher schools increased from 15 to 54 per cent. Enrolment in fully private schools remained at around 7 per cent throughout this period.

The Chilean school choice system became one of the most deregulated in the world. Private-voucher schools, unlike public schools, could select their students and could be explicitly for-profit. The restriction to charge tuition to supplement the voucher subsidy was eased in 1993. Public schools were allowed to charge fees only at the secondary level, although in practice, few of them did. At its inception, the Chilean per-student subsidy was flat; it did not vary with family socio-economic resources. The flat voucher and the ability to select students provided strong incentives for private-voucher schools to select

... quasi-markets introduce a wide range of challenges in relation to educational equity, socio-economic segregation, school segmentation and public accountability.

Research on the Chilean system agrees that it helped attain universal coverage, but did not produce noticeably higher quality or equality in access to good-quality education.

socio-economically advantaged students who had, on average, HE performance and were less demanding in terms of resources. At the same time, the add-on fees system provided an additional avenue for private-voucher schools to select students based on their socio-economic status.

Research on the Chilean system agrees that it helped attain universal coverage, but did not produce noticeably higher quality or equality in access to good-quality education. Studies that examined test score gains in private-voucher schools compared to public schools generally found positive but very small or insignificant effects (McEwan and Carnoy, 2000; Mizala and Romaguera, 2000; Lara, Mizala and Repetto, 2011). Hofflinger and von Hippel (2020) also found that school competition did not raise children's achievement. At the same time, school choice policies are associated with socio-economic inequalities in educational achievement and

socio-economic segregation between school sectors and across schools within the same sector (Hsieh and Urquiza, 2006; Elacqua, 2012; Mizala and Torche, 2012; Valenzuela, Bellei and de Los Ríos, 2013; Bellei and Muñoz, 2021).

The 1980s reforms came with an explicit neoliberal ideology and were directly inspired by Friedman's (1962) theory. After the transition to democracy in 1990, right-wing parties strongly defended the market-oriented voucher system. The centre-left Concertación coalition accepted the voucher system, but worked consistently to regulate it, with gradual but growing success (Mizala and Schneider, 2014).

In 2006, demonstrations by secondary students generated an urgent need to debate these issues. With this aim, President Bachelet established the Presidential Advisory Council on the Quality of Education that same year.



As a result, a new General Education Law was approved in 2009, including measures designed to regulate the effects of privatization, as well as new oversight bodies. Also, a reform known as ‘Preferential School Voucher’, implemented in 2008, transformed the flat voucher system into a means-tested one (**Mizala and Torche, 2017**). Further, in 2015, during the second Bachelet administration (2014–2018), structural reforms were approved by Congress, which maintain families’ school choice, but forbid private-voucher schools from charging add-on fees, operating at a profit or selecting students. Moreover, public school administration is being transferred from municipal governments to 70 new local public education services.

All these recent reforms have transformed the Chilean school choice system from one of the most deregulated in the world to one that more closely resembles the Netherlands’ school choice system, where the government fully funds private-voucher schools, has a means-tested voucher, and prohibits extra fees and student selection. Although the Chilean case may be extreme, its experience nonetheless holds potentially valuable lessons for other countries. The Chilean case also provides lessons for the political economy of reforms that seek to regulate privatized education systems, which generate much opposition from the private educational sector and the families of this sector (**Cummings, Mizala and Schneider, 2021**).

BOX 2: PRIVATE SCHOOLING IN INDIA

About 37 per cent of students in India, from preschool to senior secondary, are enrolled in Private Unaided Recognised schools (**Government of India, 2019–2020**). The proportion has been increasing, at about 1 per cent per year, over the last five years (**KPMG, 2020**). Researchers have attributed this increase to parental preferences on matters of quality (**Tooley, Dixon and Gomathi, 2007; Tooley et al., 2010**), means of instruction – specifically English instruction (**Sarangapani, 2009; Sarangapani and Winch, 2010**) – and continuity from preschool through to secondary education (**Juneja, 2007**). The increase in enrolment is noted even in the so-called ‘budget school’ segment, which suggests that the poor are also sending their children, both boys and girls, to private schools with English instruction. Thus, the private school sector has a renewed importance in education policy, research and advocacy. Key neoliberal considerations such

as efficiency, accountability and value for money (**Sarangapani and Mukhopadhyay, 2018**) have become the basis for examining the role of the state not only in the management of schools – in determining the salaries, qualifications and contracts of teachers – but also in regulation through recognition and financing models.

The emergence and growth of a non-state or ‘private’ school sector has colonial roots. By 1870, Britain was introducing compulsory education laws in the UK, but in the colonies, including India, the growth of schools relied on ‘voluntary’ efforts with a limited amount of financing in the form of ‘grant-in-aid’ (**Jain, 2018a**). The colonial state’s oversight was limited to inspection and the examination system, both of which had distorting effects on pedagogy, teacher status and service conditions (**Kumar, 1988, 2014**). The landscape

The emergence and growth of a non-state or ‘private’ school sector has colonial roots.



included the significant presence of missionaries who ran schools for a range of social classes and groups, including ‘untouchable’ castes and girls. Several community efforts led to schools being funded philanthropically, and private education with English instruction, modelled on elite British schools and accessed by indigenous elites, emerged. Schools providing ‘English medium’ education that were funded by student fees and linked to the promise of colonial employment also emerged at this time (**Jain, 2018a**). Thus ‘private’ schools, emerging from and serving a range of social and private interests, were significant in the educational landscape at the time of Independence in 1947.

The Education Commission (1960–1964) noted that about 33 per cent of educational institutions were private – and they dominated in preschools (up to 70.9 per cent) and secondary schools (69.2 per

cent) (**NCERT, 1970, quoted in Jain, 2018a, p. 54**). The Education Commission also noted a range of problems associated with this pervasive private school sector: stratified clientele based on class, variable quality, financial precariousness and unscrupulous management (**Jain, 2018a**). However, its recommendation of a neighbourhood-based common school system was never implemented. In the Right to Free and Compulsory Education Act of 2009, up to 25 per cent of total private school enrolment is expected to be made up of students from the weakest economic groups in the neighbourhood (between ages six to fourteen). The respective state government provides the fee, according to a fixed calculation. This is being implemented to varying degrees throughout the country, based on informed rules (**Mehendale et al., 2015**).

According to Article 19(1)(g) of the Constitution of India, private persons are entitled

... while private schooling is permitted by law, private schools are required to be for profit and are generally registered as societies or trusts.

to establish and maintain schools, although this right is not absolute and is subject to reasonable restrictions. It also permits schools to be regulated in order to ensure that the constitutional objectives are protected (**Ambast, Gaur and Sangai, 2017, p. 10**). Thus, while private schooling is permitted by law, private schools are required to be for profit and are generally registered as societies or trusts. While initially regulatory norms dictated that salaries of teachers must be at par with the state schooling system, there have been changes in regulations governing the use of tuition fees; in several states, for example, teachers' salaries are fixed based on fee collections. States have also relaxed the entry requirements needed to establish a school; for instance, infrastructure requirements such as playgrounds can be officially overcome by signing contracts for use of municipal grounds in the locality (**Sarangapani and Winch, 2010; Jain, 2018b; Sarangapani, 2018**). The medium of instruction is also

a matter of choice and, with very few exceptions, private schools offer education in English, which is both a status symbol and widely regarded as essential for employment in the private sector. The medium of instruction is thus an important consideration in school choice, enough to feature in the election manifestos of political parties; on winning elections, ruling parties in some states have proceeded to issue government orders to convert government schools that mandatorily offered education in the regional language/mother tongue to English instruction.

Several studies comparing government and private schools draw on the idea of a weak state which cannot hold teachers accountable, while the market orientation of private schools keeps them efficient and effective. They find positive effects of private schools on teacher absenteeism and learning outcomes, on 'greater accountability', 'time



There is evidence of school clientele stratification in both government and private schools – along class, disability and communitarian lines.

on task', 'value for money', and on even teacher satisfaction in working for improvement of their community, albeit at low salaries (**Kremer et al., 2005; Kingdon, 2006; Muralidharan and Sundararaman, 2011, 2015**).

There is also a tendency among researchers to demonize public school teachers as negligent, apathetic, unprofessional and unaccountable, who are more interested in politics and money, thus perpetuating caste- and gender-based discrimination (**Kingdon and Muzammilm, 2003; Vasavi, 2015**).

A more complex picture of the dynamics of class, pedagogy and quality across school types emerges when the analysis takes into account the stratified nature of Indian society and the various private players involved in schooling. There is evidence of school clientele stratification in both government and private schools – along class, disability and communitarian

lines. Pedagogical forms in these schools also seem to vary according to the social class of their students (**Jain, 2018a; Sarangapani, 2018**). Claims regarding learning gains in these private schools, after controlling for household characteristics, are found to be marginal or nil (**Chudgar and Quin, 2012**). An experimental study involving school vouchers found that the initial learning gains accessed through vouchers in private schools were later reversed (**Karopady, 2014**). Schools catering to the poor, whether government or so-called 'budget' private, tend to have pedagogies that are rote-based and involve drill and repetition. Instruction in English only seems to exacerbate the use of such methods. The few exceptions to this are in public schools and schools run by religious charities (**Jain 2018b; Sarangapani, 2018; e.g. Shankar and Linden, 2014 on associated teachers' beliefs**).

The shadow education sector receives increasing attention because of its role in maintaining and exacerbating social inequality.

3.5 .2 .3

FORMS OF PRIVATIZATION IN EDUCATION

SHADOW EDUCATION: THE GLOBAL GROWTH OF PRIVATE SUPPLEMENTARY TUTORING

The period since the last decade of the twentieth century has brought huge growth in the so-called shadow education system of private supplementary tutoring (Bray, 1999, 2017; Byun, Chung and Baker, 2018). The shadow metaphor is used because much of the content in the sector mimics that in schooling: as the curriculum changes in schools, so it changes in the shadows. Initially, it was particularly prominent in East Asia (Zhang and Yamato, 2018), but it has now become a global phenomenon and is present even in Nordic countries, which have long had a reputation for egalitarianism and high-quality schooling that does not need to be supplemented (Christensen and Zhang, 2021).

The shadow education sector receives increasing attention because of its role in maintaining and exacerbating social inequality. Because it is a private sector activity, middle- to high-income families are able to invest more than low-income families. As such, shadow education maintains stratification, often undermining government efforts to equalize opportunity (Zhang and Bray, 2018).

Throughout the world, the greatest driver of demand for shadow education is social competition. This is especially evident during final examinations that determine opportunities for further study and/or employment. Families increasingly consider schooling to be inadequate to meet their aspirations and view shadow education as a supplementary component to secure the required advantage. As more and more families access shadow education, others feel pressure to participate or risk being left behind.

To some extent, this pattern reflects the global expansion of schooling noted above, in line



with advocacy by UNESCO and others in the Education for All (EFA) movement (**UNESCO, 2000**). As primary and then lower secondary education became universal, upper secondary and then university education were needed to provide a point of difference. Indeed, some societies have reached the point at which a university degree is not enough, and postgraduate qualifications are necessary.

These patterns have two implications. Firstly, in previous eras young people might have left school early because of a lack of opportunities; now they can compete with others using shadow education to assist in that competition. Secondly, because unit costs are greater at higher levels of education, government budgets are stretched. This may impact on the quality of education, causing frustrated families to seek private tutoring to bridge perceived gaps in education. Insofar as education is a positional good (**Hollis, 1982**), a major aim among parents is to secure better grades for their

children and then access to more prestigious schools and universities to enhance the career choices and life chances of their offspring. Yet once one group of parents does this, others feel obliged to do the same until patterns build up to what Lampl (**2017, p. 2**) calls an educational ‘arms race’.

The EFA movement has also unintentionally contributed to the growth of shadow education insofar as the expansion of schooling has been achieved at the expense of quality. Many families perceive schooling to be inadequate, particularly when classes are large, and teachers do not have the necessary resources to work with big classes (**UNESCO, 2015a; World Bank, 2018**). In countries where teachers and schools are heavily involved in extra-curricular tutoring, such as Cambodia, Myanmar and Turkey, governments struggle to provide EFA in the mainstream system due to a lack of capacity and necessary resources. Schools retain teachers through the income they earn from tutoring. Instead of adopting policies to prevent the growth of

**...the greatest driver
of demand for shadow
education is social
competition.**



such a phenomenon, governments have tolerated teachers charging supplementary fees to tutor their students, since it allows them to continue underfunding the system. In such contexts, shadow education is a cheap way of sustaining the ‘free’ system of public schooling.

Shadow education may be supplied by teachers seeking to supplement their incomes through informal tutoring, and by university students, retirees and others working on an informal basis. In Egypt, for example, a 2014 national survey indicated that 36 per cent of sampled lower secondary students



received private (one-on-one) supplementary lessons outside school, 15 per cent received private group supplementary lessons outside school, and 5 per cent received private group supplementary lessons at school (**Sieverding, Krafft and Elbadawy, 2019, p. 571**). Among these students, 71 per cent received tutoring from their own teachers.

More formally, shadow education may be provided by the commercial sector, and is diverse in terms of the size, type and market reach of companies. Around the world, the majority of companies are small and serve their immediate localities. In

China, for example, one report (**MobData Research Institute, cited by Zhang, 2019, p. 27**) groups industry operators into three categories: (1) nationwide companies operating with branches in first- and second-tier cities that are on their way to reaching third-tier cities; (2) region-wide companies operating across one province or municipality, with branches mainly in first-, second- and third-tier cities; and (3) smaller enterprises which range from one-person workshops to medium-sized companies. The first category accounts for less than 5 per cent of the market share, while the third category accounts for the majority (see Box 3).

BOX 3: CHINA'S EFFORT TO DEINDUSTRIALIZE AND DECAPITALIZE SHADOW EDUCATION

During the 2000s and 2010s, shadow education grew substantially in China, and in 2020 it constituted a parallel system with nearly half a million registered companies (**Zhang and Bray, 2021**). Online tutoring was

dramatically boosted in 2020 by COVID-19, directing millions of students to digital learning. The Key Laboratory of Big Data Mining and Knowledge Management reports (**2020, p. 17**) that the online education consumer market grew from

RMB8,520 (US\$1,230) million in 2013 to RMB88,430 (US\$12,780) million in 2020. The corresponding market penetration rate increased from 6.8 per cent in 2013 to 15.0 per cent in 2019, and jumped dramatically to 85.0 per cent in early 2020 when COVID-19 struck. During this period, Big Tech companies and accompanying capital flooded the marketplace and contributed to an enormous expansion of online tutoring and to advertising wars between the major players. Existing problems, including false advertising, consumer rights violations and low-quality tutoring, worsened.

The Chinese Government tackled these problems in 2018 and 2019 with some success. However, policy-makers found that once shadow education became a target for national and international capital investment, the sector grew uncontrollably. In addition, concerns intensified regarding the larger issues

of the capitalization and industrialization of tutoring, which had become a stand-alone system with backwash for school operations.

As a result, in 2021, the Central Committee of China's Communist Party and the General Office of the State Council jointly released a policy titled 'Further Reducing the Burden of Homework and Out-of-school Tutoring for Compulsory Education Students'. The policy aimed at 'double reduction', that is, of school homework and external tutoring. The overall goals were to protect student well-being, reduce study and financial burdens, and alleviate parental anxiety. The measures targeted the for-profit nature of capital, which was viewed as the cause of many negative aspects of the shadow education industry. The overall policy was followed by a series of regulations addressing specific aspects, such as tutoring materials, fees and tutors' qualifications.



Schools, the discourse adds, should not place the responsibility for education on families and shadow education, and should provide equitable and quality education for all.

The policy measures were particularly aimed at deindustrializing and decapitalizing shadow education; they reduced the size of the market, and were compatible with government efforts to decapitalize private (minban) schools. At the level of compulsory education, academic tutoring providers were required to operate as not-for-profit institutions. While these providers had previously been most in demand during summer and winter holidays and weekends, these times were now prohibited with academic tutoring restricted to workday evenings. Accompanying measures addressed public schooling, and the Government collaborated with the media and schools to promote rational consumption and parental responsibility. After-school programmes were developed, and the school day at the compulsory education level was extended to 5–6 pm.

Most of these measures focused on the supply of education. The official discourse is very clear: that schools should be the principal institutions fulfilling educational goals. Schools, the discourse adds, should not place the responsibility for education on families and shadow education, and should provide equitable and quality education for all. From this perspective, shadow education should be limited and no more than a complement to schooling where necessary.

On the demand side, after-school programmes absorbed some of the child-care and homework support that had previously been provided by the tutoring providers. However, research by Zhang (2021), before and after the double-burden reduction policy, shows that one third of parents still considered shadow education necessary and anticipated continuing with it despite the ban. Many middle-class parents in big cities became anxious as a result of the policy,

The double-reduction policy is a unique example of a strong state confronting a strong market.

since the competition remained fierce for their children but they had fewer choices in the market.

The policy had an immediate impact on shadow education providers, especially in the capital market, and on other registered tutoring companies. Four months after its implementation, the industry saw a sharp drawback of capital investment, and many big companies went bankrupt. The companies that previously were among the largest in the world saw a cut of at least 50 per cent of their academic tutoring. An estimated 50 to 70 per cent of employees in these tutoring companies were expected to lose their jobs. However, many turned to hidden self-employment online or offline. These hidden activities signalled that while the legitimate tutoring companies were subject to fierce regulations, the black market expanded in response to the persistent demand. Self-employed tutors and informal classes mushroomed, and

parents with social and financial capital formed ‘learning pods’ for group tutoring. In response, the Government released regulations and sample contracts that reminded parents of the potential risks of illegal tutoring. However, as long as parents still felt that school did not give their children the learning they needed (i.e. personalized attention), and competition continued in the stratified system, the demand for tutoring would not disappear just because the tutoring provided by legal companies had been reduced.

The policy has yielded complex implications for equity. Families that previously had little access to tutoring felt it showed a strong commitment to equality. At the other end of the scale, the privileged social elite who could arrange private tutors rather than be dependent on the companies were hardly affected. Among lower-middle- and middle-middle-class families, many felt that the policy



Parental anxieties may appear to be educational anxieties, but they reflect status anxieties and social construction of achievement and success in a hierarchical society of deepening social stratification and accelerating change.

made life more difficult: they previously had many choices in the marketplace and could compare prices and choose affordable tutoring services, but now they had to either reduce tutoring – leaving their children’s fate mostly to schools – or risk using black market tutoring which is full of uncertainties in terms of quality, safety and price.

The double-reduction policy is a unique example of a strong state confronting a strong market. Rather than merely criticizing the negative dimensions of privatization and marketization in education, the Chinese Government took action. The determination to regulate tutoring at

national and local levels is to be applauded. Yet, as society develops and expectations for education expand and diversify, schools alone cannot fulfill all educational goals and solve all social problems, especially when there is tension between the private and public good. As shown in comparative studies (e.g. Christensen and Zhang, 2021; Zhang, 2021), the root of shadow education problems in China lies not only in education but also in the wider society. Parental anxieties may appear to be educational anxieties, but they reflect status anxieties and social construction of achievement and success in a hierarchical society of deepening social stratification and accelerating change.

THE GLOBAL EDUCATION INDUSTRY: TRENDS AND EMERGING ISSUES

The participation of private institutions in the provision of education is the most well-established manifestation of

the education privatization phenomenon, but it is neither the most widespread nor the most profitable. In recent decades, new forms of privatization, commercialization and profit-making in education have emerged and spread; the concept of the

GEI has gained salience due to its attempt to capture and decipher this phenomenon (**Verger, Lubinski and Steiner-Khamsi, 2016; do Amaral, Steiner-Khamsi and Thompson, 2019**).

The GEI is a dynamic and rapidly evolving sector, with constant product trend changes, innovations, rebranding, and mergers and acquisitions between companies. Investment advisors, such as GSV-Advisors and HolonIQ, calculated that the value of the global education market was US\$4.9 trillion in 2015 and that this number would at least double by 2030. The USA accounted for about 28.9 per cent of the GEI in 2020, although the sector is growing exponentially in other countries such as China (**Research and Markets, 2021**).

The GEI covers a broad range of goods and services that interact with and penetrate public education systems around the world. The evolution of the internet and learning technologies has widely facilitated the

cross-border supply and the transnational nature of many GEI services. These services include the educational programmes of private institutions (from K–12 to life-long learning), but also a much broader range of goods and services that are sold to public – as well as private – educational institutions (**Williamson and Hogan, 2020**). Some of the most relevant of these goods and services are educational technology (EdTech) hardware, online e-learning and teaching platforms, educational materials (such as textbooks, both digital and analog, curricular packages, etc.), test preparation and certification services, learning analytics and management systems, school/university organization software, edu-marketing and students' recruitment services, private tutoring and supplemental education services, behavioural management applications, teacher training programmes, and school improvement and consultancy services (**see Box 4**).



BOX 4: THE RAPID EVOLUTION OF EDTECH AND THE DIGITALIZATION OF EDUCATION²

The EdTech industry has expanded exponentially in the last few years. The massive school closures triggered by the COVID-19 pandemic have forced the adoption of online learning and communication technologies in numerous educational settings. However, this is merely part of an upward trend that began many years before the pandemic.

Technological giants such as Google, Apple, Windows and Facebook have promoted their educational divisions and products. These companies have a global reach, but in some regions face competition from less well-known tech companies such as Tencent and Alibaba, both based in China. Also, more well-established and conventional edu-businesses such as Pearson or McGraw Hill are moving towards digital education. As part of their business strategy, many of these big companies are acquiring

numerous start-ups and other small businesses in the sector.

Personalized learning platforms have gained more salience in the current context. Thanks to integrated assessment tools and related algorithms, personalized learning allows instruction to be adapted to the learning pace of the user. The business model behind these and other learning products usually consists of regular subscriptions, or a one-time purchase, or giving free access to users. In the latter case, companies receive advertising income or sell users' data to third parties in return.

EdTech developments can contribute to improving the educational experiences of many students. However, as we show below, these developments also raise concerns that include data privacy, public accountability, economic efficiency and the professional autonomy of teachers.

The massive school closures triggered by the COVID-19 pandemic have forced the adoption of online learning and communication technologies in numerous educational settings.

²Source: Hogan, Sellar and Lingard (2016); Bolea (2020); Williamson and Hogan (2020); (WG2- ch6, section 3).

Edu-businesses are at the centre of the GEI, but their economic success is contingent on their interaction with a broader configuration of actors and systems of rules, which are also key in making and reproducing educational markets.

The goods and services of the GEI are produced and delivered by a broad range of economic actors, among which profit-oriented edu-businesses with the capacity to operate transnationally stand out (Ball, 2012). Edu-businesses are at the centre of the GEI, but their economic success is contingent on their interaction with a broader configuration of actors and systems of rules, which are also key in making and reproducing educational markets (Amaral, Steiner-Khamsi and Thompson, 2019). These include: (1) trade associations dedicated to optimizing opportunities for investors looking to capitalize on the education sector; (2) private investors, including private equity funds and venture capital; (3) public funders via punctual subsidies or the establishment of longer-term public-private partnerships with GEI actors; (4) consumers, from individual consumers – families, students, teachers – to educational institutions and local/national governments; (5) coalitions and interest groups advocating pro-market regulations in

education; and (6) regulators, including national and sub-national regulators, but also international trade agreements that contribute to liberalizing international exchanges and sales and international guidelines to help governments interact with edu-businesses (Junemann, Ball and Santori, 2016; Verger, Lubienski and Steiner-Khamsi, 2016). One example of the latter is the General Agreement on Trade in Services (GATS). Since the 1990s, World Trade Organization member countries have been negotiating the liberalization of a range of services, including educational services, within this trade agreement. The GATS has contributed significantly to the development of the GEI by providing enormous fiscal and administrative facilities for edu-business in accessing education markets abroad, and selling their education services internationally (Robertson, Bonal and Dale, 2002; Verger, Lubienski and Steiner-Khamsi, 2016).

In addition to economic factors, political factors are key in the construction and



Since the 1990s, World Trade Organization member countries have been negotiating the liberalization of a range of services, including educational services, within this trade agreement.

scaling up of the GEI, and in understanding the ever-changing nature of this industry sector. Several advocacy networks, which include edu-businesses, policy entrepreneurs and/or philanthropic organizations, are very active in supporting the expansion of different factions of the GEI, the business strategy of specific corporations or, more broadly speaking, business-oriented reforms that are conducive to commercialization and marketization in education (Au and Lubienski, 2016; Fontdevila, Verger and Avelar, 2019). Currently, the most important competitors in the global education services industry are large transnational corporations such as BenQ, Blackboard, Cisco Systems, Huawei Technologies, Kaplan, Microsoft, Oracle, New Oriental Education & Technology Group, and Pearson PLC (Research and Markets, 2021).

The rise of the GEI is not an isolated phenomenon, as other sectors beyond education have also witnessed similar globalizing and marketizing trends. Indeed,

as a result of neoliberal policies in a globalized economy, the growth of market forces, logics and dynamics is present in many areas of activity that were previously thought to be outside the realm of the market (Verger, Lubienski and Steiner-Khamsi, 2016). Nonetheless, the emergence and expansion of the GEI also reflects particular changes and trends in the education sector, which include increasing performance pressures for educational institutions; the prominent role of data-gathering as a governance strategy; the integration of information and communication technologies for learning and testing within instructional improvement strategies; the increasing educational demand in most developing economies; and the fact that the global economy and technological advances constantly require the re-skilling and up-skilling of the labor force.

The level of penetration and the configuration of the GEI vary by region. GEI expansion has been more widely documented in Anglo-Saxon countries such as the

Online learning platforms have the potential to bring supplementary education to socially disadvantaged households, or to support students with learning or sensorial disabilities.

USA, the UK and Australia where important sums of governmental and/or philanthropic funds are available for edu-business products and services. However, in other contexts, for linguistic, political and/or economic reasons, the most well-established Anglo-Saxon edu-businesses have not proliferated. For instance, in Chile, there is a very dynamic and heavily subsidized network of school improvement and consultancy services that are mostly made up of small-scale local players (**Osses, Bellei and Valenzuela, 2015**). And in many continental European countries, services such as education consultancy or external assessments tend to be directly provided by the state or are more frequently outsourced to public universities than to for-profit companies (**Verger, Fontdevila and Parcerisa, 2019**).

THE GEI DEBATE: EFFECTS ON THE QUALITY, EQUITY AND DEMOCRATIC GOVERNANCE OF EDUCATION

Proponents in favour of strengthening the participation of

private interests and profit-making in education see advantages in the rise of the GEI, including educational expansion at a lower cost, the promotion of innovation in education, and the possibility of individualizing education and instruction. Online learning platforms have the potential to bring supplementary education to socially disadvantaged households, or to support students with learning or sensorial disabilities. In developing countries in particular, EdTech solutions are increasingly seen as a cost-effective way to promote individualized learning and to address issues related to excessively high student–teacher ratios. There are also those who consider EdTech solutions a tool to hold teachers accountable and strengthen the control of educational delivery (**Adelman et al., 2015**).

A recent literature review of EdTech in low-income countries (LICs) shows that technology interventions focusing on self-led learning and improvements to instruction raise learning outcomes more effectively than



... access to technology initiatives such as one laptop per child may have improved students' digital skills, but their effects on academic performance have tended to be null or even negative.

other interventions such as those aiming to control teachers' and students' behaviour, and to expand access to technology through the distribution of laptops, tablets or similar devices (**Rodríguez-Segura, 2021**). In fact, access to technology initiatives such as one laptop per child may have improved students' digital skills, but their effects on academic performance have tended to be null or even negative (**Yanguas, 2020; Rodríguez-Segura, 2021**).

Other voices argue that technology, and other GEI products, when properly adopted in educational systems could 'unlock the creative skills and initiative of its teachers' (**Amaral, Steiner-Khamisi and Thompson, 2019, p. 2; see also Schleicher, 2017**). Nonetheless, there are also those who consider that the professional autonomy of teachers could be undermined by the prescriptive and algorithm-based learning materials of the EdTech industry (**Williamson and Hogan, 2020**).

Critics often refer to the challenges triggered by the emergence of

the GEI in terms of democracy and accountability. To them, the increasing participation of large transnational corporations in the governance and delivery of education entails the undermining of democratic control of public education. In this respect, the shift in accountability structures away from democratic to corporate/consumer arrangements runs the risk of reshaping the orientation of education as a public good (**Komljenovic and Robertson, 2016**).

That is, corporations are legally accountable primarily to their stockholders and must work first and foremost to create returns for those investors, which are not necessarily aligned with those of the customers, that is, teachers, students, their families, their communities and society at large (**Verger, Lubinski and Steiner-Khamisi, 2016**).

The GEI can also generate efficiency challenges for public education systems. In fact, beyond the acquisition of educational hardware, which tends to be costly, there are additional expenses associated with their maintenance

... the data ownership and privacy issues of GEI products, especially when teaching, learning or assessment services collect users' data and do not provide sufficient data protection guarantees.

and regular updating. In 2017, the OECD organized the Global Education Industry Summit with the aim of promoting networking between the EdTech industry, governments and schools.³ Specifically, the summit attempted to address increasing concerns regarding the unregulated nature of the relationship between the public and education industry sectors. This relationship is often governed by a ‘wild west’ of commercial practice that derives from poorly informed purchases, something that in turn ‘could imply a huge drain on schools’ resources’ (OECD, 2014, p. 3).

Finally, there are those who highlight the data ownership and privacy issues of GEI products, especially when teaching, learning or assessment services collect users' data and do not provide sufficient data protection guarantees. Part of these data might be highly sensitive and violate students' privacy by, for instance, allowing the surveillance of students,

harming their reputation or being used for predictive sorting purposes (Nemorin, 2017; Wyatt-Smith, Lingard and Heck, 2019; Bolea, 2020). Initiatives such as Responsible Data for Children (RD4C), promoted by UNICEF, have recently emerged in an attempt to address such concerns.⁴

3.5 .3

FINANCING MODELS IN EDUCATION: IMPLICATIONS FOR HUMAN DEVELOPMENT

3.5 .3 .1

TRENDS AND PATTERNS OF EDUCATION FINANCING IN LICs AND LMICs

Education is essential for the development of individuals and societies, and crucial to the

³For further reading on critical issues in the EdTech industry see WG2 ch6, section 5).

⁴<https://rd4c.org/index.html#principles>



Indeed, in the education of an average child aged eighteen, the average LIC government will have invested around US\$1,300, while the average HIC government would have spent about US\$110,000.

process whereby modern states disseminate a consciousness of common loyalty or shared citizenship (Green, 1990). In practice, few if any states have been willing to leave education provision to the vagaries of the free market. However, the path to development is not the same for all countries; those with low resources have less capacity to promote quality and equity in their educational systems and fulfill the promise that education carries. Indeed, there is great inequality in education spending between countries. In 2014, annual spending on education reached US\$4.7 trillion worldwide. Of this, 65 per cent is spent in high-income countries (HICs) and 0.5 per cent in LICs, despite the fact that both groups of countries have similar school-age populations. Governments represent on average 79 per cent of total spending (fluctuating from 82 per cent in HICs to 59 per cent in LICs) and households 20 per cent on average (fluctuating from 18 per cent in HICs to 29 per cent in LICs), while donors represent 12 per cent of total spending on

education in LICs and 3 per cent in lower-middle-income countries (LMICs) (UNESCO, 2019b, see Table 1). Indeed, in the education of an average child aged eighteen, the average LIC government will have invested around US\$1,300, while the average HIC government would have spent about US\$110,000 (Al-Samarrai, Cerdan-Infantes and Lehe, 2019).

Since lack of education and unequal access to quality education are essential sources of inequity, international organizations have defined standards and goals for countries. These goals are based on guiding principles, such as reducing poverty and inequity, and they have indicators that allow progress to be monitored and reported.

In 2015, the United Nations established a new sustainable development agenda for 2030 and all member countries adopted a set of goals to end poverty, protect the planet and ensure prosperity for all. Sustainable Development Goal 4 (SDG 4) aims to promote lifelong learning and guarantee

inclusive and quality education for all. Indeed, education is essential to achieve the SDGs; it is vital for promoting human rights and dignity, eliminating poverty and improving sustainability. But access is not enough – we need to ensure the quality and relevance of what people learn throughout life in a complex and changing world. Tackling inequality in education is critical to the success of the Education 2030 agenda because the extent of inequity in (and as a result of) education is shocking (**UNESCO, 2015d**).

UNESCO ... assumes that in LICs, government expenditure in pre-primary, primary and secondary education will need to increase by 50 per cent, from 2.6 to 3.9 per cent of GDP, between 2015 and 2030.

In order to achieve the 2030 goals, which include ensuring good quality, universal pre-primary, primary and secondary education in LICs and LMICs, and the necessary conditions to achieve such an education, such as teacher–student ratios, teacher salaries and school infrastructure, a relevant exercise is to estimate the costs involved. Allowing for differences in educational goals, for example, different levels of pre-primary education and completion levels of secondary education, studies report the

estimated average annual cost – during the period 2015–2030 – to range from US\$240 to US\$340 billion (**UNESCO, 2015c**). Thus, economic growth and government spending on education will need to increase in LICs and LMICs. UNESCO (**2015c**) assumes that in LICs, government expenditure in pre-primary, primary and secondary education will need to increase by 50 per cent, from 2.6 to 3.9 per cent of GDP, between 2015 and 2030. The total annual financing gap between available domestic resources and the amount necessary to reach the education targets should be filled by external resources, thus, donor aid for pre-primary, primary and secondary education must increase significantly (**Wils, 2015; UNESCO, 2015c**). Considering domestic funding, UNESCO's GEM Report estimates that there will be an annual funding gap of at least US\$39 billion per year during the period 2015–2030 in LICs and LMICs to meet the SDG4 commitments (**UNESCO, 2019b**).

Besides the lack of education financing, it is relevant to consider



In 2000, the governments of only six countries spent more than 5 per cent of GDP on education, but by 2015 there were thirteen countries in that category.

the issue of equity in spending; for instance, how the education budget is allocated to the different levels of education (primary, secondary, etc.). To the extent that investment in HE competes with investment in secondary and (especially) basic education, its effect would not contribute to greater social equality.

Credentialism is also something that should be considered, since it implies that the universalization of basic and secondary education may not lead to a more equitable social order, if the more privileged maintain their competitive advantage by stepping up investments in their own or their children's human capital.

GOVERNMENT EXPENDITURE HAS GROWN BUT MORE IS NEEDED

The **Education 2030 Framework for Action (UNESCO, 2015c)** established two benchmarks for public financing of education in order to achieve the 2030 educational goals: governments should allocate at least 4 to 6 per cent of GDP

and/or allocate at least 15 to 20 per cent of public expenditure to education. In 2017, the average global public education expenditure was 4.4 per cent of GDP, with regional averages ranging from 3.4 per cent in Eastern and South-East Asia to 5.1 per cent in Latin America and the Caribbean. The average global share of total public expenditure dedicated to education was 14.1 per cent, ranging from 11.6 per cent in Europe and North America to 18 per cent in Latin America and the Caribbean (UNESCO, 2019b).

Most Latin American countries (LACs) dedicate a larger percentage of their GDP to education than many wealthier countries. In 2000, the governments of only six countries spent more than 5 per cent of GDP on education, but by 2015 there were thirteen countries in that category. The average percentage of GDP allocated to education in 2015, based on 22 Asian countries, was 4.4 per cent, with seven countries spending more than 5 per cent. The OECD average was 4.8 per cent of GDP,

TABLE 1: FUNDING SOURCE AS A SHARE TOTAL OF FUNDING

	LICS	LMICS	UMICS	HICS
 GOVERNMENT	59	73	75	82
 HOUSEHOLDS	29	24	25	18
 DONORS	12	3		
TOTAL	100	100	100	100

(PERCENTAGE OF TOTAL EDUCATION FUNDING, 2014)

Source: UNESCO (2019b)

a figure surpassed by seventeen of the twenty-nine LACs and ten Asian countries for which data were available (**OECD, 2017**).

In 2015, LICs allocated around 3.7 per cent of GDP to education (**UNESCO, 2017a**), and 4 per cent in 2017 (**UNESCO, 2019a**). LMICs allocated approximately 5 per cent of GDP on education (**UNESCO 2017a**). LICs increased their share of public spending on education from 14.9 per cent in 2012 to 16.1 per cent in 2017 and LMICs increased their share of public

spending on education from 15.6 per cent in 2012 to 16.4 per cent in 2017, which means that in recent years both LICs and LMICs, on average, have achieved the benchmarks for public financing of education (**UNESCO 2015b, 2019a**).

However, averages aside, many countries are still not allocating enough resources to basic education; in fact, 43 out of 148 countries from different income groups are not meeting the benchmarks (**UNESCO, 2019b**).



... many countries are still not allocating enough resources to basic education; in fact, 43 out of 148 countries from different income groups are not meeting the benchmarks.

In general, the poorest countries, with larger school-age populations and greater educational challenges, spend a larger part of their budget on education, but they have trouble mobilizing sufficient domestic resources. For instance, since tax income alone is not enough, education financing by African governments is still inadequate, thus per capita expenditure on education remains very low. Hence, most African countries have to rely on international aid to sustain education financing to cope with their fast-growing young populations. The main challenges for these countries are to increase or maintain economic growth, and leverage the dividends from growth by increasing spending on education, by reallocating spending, raising more revenue or both. They also need to increase tax revenues by reducing tax avoidance and evasion.

In addition, not only is the total amount of spending on education important, so is its distribution. In 2016, the share of public education expenditure oriented to

primary education was on average 35 per cent, with percentages ranging from 47 per cent in LICs to 26 per cent in HICs. In the case of secondary education the world average was 34 per cent of total public education expenditure, with variations from 26 per cent in LICs to 38 per cent in LMICs. This behaviour is explained by the higher share of youth in richer countries who remain in school and complete secondary education. If we compare the median level of government education expenditure per student for the different groups of countries in 2017, LICs spent more than eight times as much on tertiary education per student than on primary education per student; the ratio was two times in LMICs and 1.3 times in HICs. In addition, HICs spent more than six times as much per student on tertiary education than LICs, but thirty-two times more per student on secondary education and forty-one times more on primary education ([UNESCO, 2019a](#)). In countries with high socio-economic inequality, to the extent that the financing of tertiary

In 2014, in LICs, households accounted for 29 per cent of total spending in education; in the fourteen lowest income countries household expenditure accounted for 49 per cent.

education is done at the expense of basic and secondary education, these inequalities are deepening.

HOUSEHOLD FINANCING IS BECOMING MORE RELEVANT

Household financing plays an important role in education finance. Considering household expenditure, many countries overcome the suggested threshold of 4 per cent of GDP allocated to education. The available data show that the poorer a country, the larger the burden on households (**Table 1**). In 2014, in LICs, households accounted for 29 per cent of total spending in education; in the fourteen lowest income countries household expenditure accounted for 49 per cent. In contrast, household expenditure in the ten highest income countries represented only 13 per cent of education expenditure. For LMICs, the share of household expenditure on education was 24 per cent in 2014

(UNESCO, 2019b). This is mainly explained by the need to offset the lack of resources allocated to education by poorer governments (Steer and Smith, 2015).

According to UNESCO (2019a), 30 per cent of household expenditure was invested in tertiary education globally, with this percentage increasing to almost 70 per cent in some middle-income countries. Data for 2016 show that in countries like Ethiopia and Uganda, household expenditure represented around 40 per cent of primary education and 25 per cent of tertiary education financing; in El Salvador household expenditure represented 30 per cent of primary education and 30 per cent of tertiary education financing.

Also, remittances from abroad play an important role in household expenditure on education in LICs and LMICs – they are much more important than official

⁵ ODA is government aid that promotes the economic development and welfare of developing countries; it is the main source of financing for development aid.



development assistance (ODA)⁵. Remittances increased household education spending by 35 per cent in eighteen countries in sub-Saharan Africa and Central, Southern and South-East Asia (**UNESCO, 2019a**).

Finally, while data for household financing are not scarce, they are not standardized, so are inadequate for monitoring international goals. In particular, it is not possible to easily determine trends of household expenditure for LICs (**UNESCO, 2019a**).

EXTERNAL AID IS STAGNATING AND IS NOT APPROPRIATELY ALLOCATED

External aid to education needs to significantly increase with respect to 2010 levels to compensate for the deficit that LICs and LMICs face in achieving the education goals. UNESCO (2015c) states that donor aid across educational levels should increase at least six-fold; the Education Commission (2016) states that international finance for education should increase by about 5.6; and ODA is expected to rise from US\$13

billion to US\$49 billion (**Education Commission, 2016**).

However, external aid has remained stagnant since 2010; only in 2016 did aid to education surpass the amount spent in 2010, reaching an all-time high of US\$15.6 billion in 2018 (**Table 2**). Of that, around US\$6.5 billion was allocated to basic education, US\$3.0 billion to secondary education and US\$6.1 billion to post-secondary education in LICs and LMICs (**UNESCO, 2020**). This contrasts with growing support for health, at US\$20 billion annually; in addition, investments in infrastructure have doubled in the past decade (**IFFEd, 2020**). The share of education in total ODA, excluding debt relief, declined sharply from 10 per cent in 2010 to 7 per cent in 2017, mainly because donor countries prioritized other sectors like health, energy or the environment (**UNESCO, 2019b**). Multilateral and bilateral aid for education from official donors, which amounted to 13 per cent of all international aid by 2010, has been falling and is now at 10 per cent. All

Multilateral and bilateral aid for education from official donors, which amounted to 13 per cent of all international aid by 2010, has been falling and is now at 10 per cent.

aid oriented to education in developing countries amounts to only US\$10 per child (**IFFEd, 2020**).

In terms of allocation, during the entire 2002–2018 period, the amount of aid to post-secondary education was similar to aid allocated to basic education and much higher than aid given to secondary education (**Table 2**). In recent decades, seven of the fifteen largest donors increased aid to post-secondary education and decreased aid to primary and secondary education. This is because post-secondary education tends to be aligned with donors' strategic interest in generating ties with countries' future leaders. This aid, in the form of scholarships, exchange programmes or other support for students' mobilization, benefits students studying in donor countries, but does not necessarily strengthen HE systems in developing countries (**UNESCO, 2017b**). In 2012, about seventy two of direct aid to post-secondary education was in the form of scholarships, exchange programmes or other support for student mobilization (**UNESCO, 2015b**).

In 2012, about seventy two of direct aid to post-secondary education was in the form of scholarships, exchange programmes or other support for student mobilization

In recent decades, new donors from emerging economies have played an important role. Brazil, China, India and South Africa have committed to international aid in primary education (by financing infrastructure and sustainable development projects) and also in scholarships and international exchange programmes for post-secondary and tertiary students, perhaps seeking to offset the influence exerted by industrialized countries through these mechanisms. These countries have also disbursed resources to finance programmes to support the educational system, such as coordination agencies, infrastructure maintenance and teacher training (**UNESCO, 2015b**).

FINANCIAL TOOLS FOR BOOSTING EDUCATIONAL GOALS

The international community has realized the need for tools that could help finance the education deficit of LICs and LMICs in order to move towards the 2030 goals. It is clear that a more rational and coordinated approach



to allocating aid resources across countries is urgently needed. To that end, two different instruments have been proposed in the last decade. The first is the Global Partnership for Education (**GPE, 2020**) Financing and Funding Framework, and the second is the International Financial Facility for Education (IFFEd), proposed by the Education Commission (**2016**). Education Cannot Wait, created during the World Humanitarian Summit

in 2016, is a fund dedicated to education in emergencies with the aim of repositioning education as a priority on the humanitarian agenda.

In sum, the world is not on track to meet the SDGs by 2030 (**UNESCO, 2019b**). Increasing internal financing – through economic growth and increased tax revenues – as well as external aid is essential for achieving the goals. However, the impact of the

TABLE 2: TOTAL AID TO EDUCATION DISBURSEMENTS BY LEVEL OF EDUCATION 2002-2018 (CONSTANT 2018 US\$ BILLIONS)

	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
BASIC EDUCATION	2.7	3.0	3.3	3.9	4.2	4.8	4.8	5.6	5.9	5.6	5.0	5.3	5.0	5.5	6.4	6.1	6.5
SECONDARY EDUCATION	0.9	1.0	1.2	1.1	1.5	1.8	1.8	2.4	2.3	2.1	2.2	2.6	2.6	2.4	2.8	2.8	3.0
POST-SECONDARY EDUCATION	2.4	4.0	3.8	4.2	4.6	4.8	4.5	5.1	5.2	5.1	4.9	4.9	4.6	4.9	6.2	5.4	6.1
TOTAL	6.0	8.0	8.3	9.2	10.3	11.4	11.1	13.1	13.4	12.8	12.1	12.8	12.2	12.8	14.4	14.3	15.6

Source: UNESCO (2020)

recent COVID-19 pandemic is an important obstacle for both sources of financing, as most countries have increased budget deficits. The need to prioritize the response to the public health emergency and to strengthen safety nets will likely reduce resources available for education. In relation to household financing, the COVID-19 pandemic has led to reduced incomes and increases in health spending, making it difficult for some families to cover education costs. Donor countries

are also experiencing a reduction in income due to slower growth and, at the same time, they need to allocate funds to face the effect of the pandemic. These reduced budgets could translate into a drop in education aid of up to US\$2 billion by 2022 ([UNESCO, 2020](#)). In fact, the UK, as a consequence of COVID-19, has slashed its international aid budget from 2020 onwards.

For this reason, it is essential,



... external aid needs to be aligned with the needs of national education systems to effectively strengthen them.

firstly, to intensify efforts to maintain the proportion of total aid allocated to education, in a context where global official aid oriented to education has stagnated. Secondly, flexibility in the use of funds is required for finance initiatives to mitigate the effect on education of COVID-19, which has most severely impacted the most vulnerable students, further increasing inequality. Thirdly, multilateral bodies such as the GPE, rather than fragmented bilateral aid efforts, must be strengthened to increase development assistance to education. Also, external aid needs to be aligned with the needs of national education systems to effectively strengthen them (UNESCO, 2020; World Bank, 2020).

3.5 .3 .2

CHALLENGES RELATED TO THE LINK BETWEEN EDUCATION INVESTMENT AND EDUCATION OUTCOMES

As noted, developing countries spend a relatively large part of their budget on education but

struggle to mobilize sufficient domestic resources. Certainly, more resources are needed, but just as important are the strategies needed to allocate and match resources with educational needs.

As sources of financing diversify, a larger set of actors gain influence in spending decisions in the school system. In many countries, local governments have emerged as important actors in the allocation and management of school finance; in other countries, schools have a greater responsibility in the use of their budgets (OECD, 2017). Finally, private education providers have become important recipients of public spending (see section 3.3.1). Therefore, since there are different bodies involved in raising, managing and allocating school funds across countries, complexity has increased. The responsibility for spending these funds is shared among an increasingly wide range of actors. Consequently, adequate governance is fundamental; it is necessary to define roles and responsibilities and to align the allocation of resources with

Policies and programmes should be subject to impact evaluations, relating inputs to associated educational processes and outcomes; their results should be used to inform resource allocation.

educational priorities, ensuring adequate accountability and transparency, and balancing accountability with trust (**OECD 2017; UNESCO, 2018**). Moreover, an adequate regulatory framework for the public funding of private providers to assure quality and equity is crucial (see section 3.3.1).

The management of educational resources should be based on strategic objectives, bearing in mind policies and programme evaluation so that available resources are used to ensure equitable access to quality education. Policies and programmes should be subject to impact evaluations, relating inputs to associated educational processes and outcomes; their results should be used to inform resource allocation. However, there are significant challenges in evaluating the impact of policies and programmes on efficiency, quality and equity in education. Some of these challenges are the complexity of educational processes, the diversity of educational goals, the different types of school governance systems, and the

importance of social and institutional arrangements in different policy outcomes (**OECD, 2017**).

In effect, researchers and policy-makers have tried to understand which policies will best improve educational outcomes. The results of these studies, for both developed and developing countries, have generally been inconclusive. According to Glewwe et al. (2014), there are at least two reasons for this. Firstly, the outcomes of a policy depend on many factors, such as the socio-economic level of the students, the way the schools are organized, the level of decentralization of the educational system, the incentives involved, etc.; then, what works in one country may well not work in another. For instance, in terms of school structure, there is evidence showing that equality of opportunity in educational outcomes is higher in integrated school systems than in differentiated school systems. An integrated school system is characterized by a structure that is common to all students



An integrated school system is characterized by a structure that is common to all students over a long period, without segregating students based on their performance.

over a long period, without segregating students based on their performance. In contrast, a differentiated school system has tracks or separate educational pathways (i.e. academic versus technical-vocational education) from an early stage (**Dupriez and Dumay, 2006**).

Secondly, much of the literature focuses on evaluating the impact of certain inputs, such as teacher characteristics, class size, student-teacher ratios, etc., but has neglected how schools are organized. Therefore, it is methodologically difficult to determine the causal impact of school resources on educational outcomes. Quality of education is not observable, and the educational outcome is multidimensional; as noted, many factors, including parents' socio-economic status, different school resources, and the ways schools are organized, contribute to educational results. Thus, it is difficult to isolate and assess the impact of each on students' learning. Moreover, the same input can have different impacts in

different educational and cultural contexts.

It is important to note that research on the relationship between spending and educational outcomes is not conclusive and should not lead to the conclusion that money (resources) does not matter. Many researchers have recognized that addressing pre-existing inequalities requires higher per-student spending for disadvantaged students. Recent studies conducted in the USA (e.g. **Jackson, Johnson and Persico, 2016; Lafortune, Rothstein and Whitmore Schanzenbach, 2018**) compare states that allocate additional money to their lowest-income school districts with states that do not. These studies show that greater funding for districts that serve the most disadvantaged students has a positive and significant impact. States that allocate additional money to their lowest-income school districts see more academic improvement in those districts than states that do not (**Lafortune, Rothstein and Whitmore Schanzenbach, 2018**). Moreover, exposure to higher levels of public

HE enrolment is highly diverse across countries; while countries such as Brazil, Chile, Colombia and Venezuela have experienced significant expansion, in Central America, gross enrolment rates are still below 30 per cent.

K–12 spending has a positive and significant effect on longer-term outcomes, like high school graduation rates, educational attainment and adult earning power; further, these effects are much more pronounced for children from low-income families (**Jackson, Johnson and Persico, 2016**). Similar results have been obtained in studies that evaluate the impact of the Chilean reform, implemented in 2008, which transformed the flat voucher into a means-tested one, adjusting the amount of the voucher according to the student's socio-economic status and the proportion of poor students attending a school. The reform had positive impacts on overall achievement and equality of educational opportunity (**Mizala and Torche, 2017**).

3.5 .3 .3

FINANCING OF HIGHER EDUCATION: ISSUES OF EQUITY AND SUSTAINABILITY

HE has always had issues with equity and sustainability, and has consistently expanded globally

(**Burrage, 2010**). This expansion is explained by the significant incentives people have to attend HE. Educational attainment provides access to better job opportunities and is associated with higher earnings during a person's working life. Also, highly educated people are more likely to report desirable social outcomes. Further, education is not only profitable for individuals, but also generates public benefits, for instance, in terms of higher tax revenue.

These reasons, together with the growth in completion rates for secondary education (**Fiszbein, Cosentino, and Cumsille, 2016; Ferreyra et al., 2017**), explain HE's expansion in LACs in recent decades. The regional average gross enrolment rate grew from 24.4% in 2000 to 44.3% in 2015; this growth is higher than in almost any other region (**Fiszbein and Stanton, 2018**). Nonetheless, HE enrolment is highly diverse across countries; while countries such as Brazil, Chile, Colombia and Venezuela have experienced significant expansion, in Central America,



The massification of primary and secondary education in Africa has fuelled a significant increase in student enrolment in African universities.

gross enrolment rates are still below 30 per cent (**UIS, 2017**).

In many LACs, the system expanded alongside economic growth, fiscal abundance and a rising middle class. As a result, access for all students grew, particularly for low- and middle-income groups who are less academically prepared than their more advantaged peers. Thus, the expansion has encompassed a more diverse body of HE students (**Ferreira et al., 2017**).

This expansion gave rise to a new situation in which there are new students who were previously under-represented and new higher education institutions (HEI) and programmes serving them. Around 25 per cent of existing HEIs have been created since the early 2000s, and the private sector has opened most of them. The market share of private and non-university HEIs has risen in most LACs (**Ferreira et al., 2017**). This increase in variety has stimulated the entry of many students into the system. In Chile

and Colombia, for instance, high-ability students had access to traditional selective programmes, while low-ability students gained access to less- (or non-) selective programmes, many of which were created during the expansion (**Fiszbein and Stanton, 2018**). This link between the expansion of private universities and colleges and the shift to mass HE was also seen earlier in East Asia (Japan, Korea and Taiwan, among other countries).

Over the last few decades, Africa has also witnessed tremendous growth in HE. The massification of primary and secondary⁶ education in Africa has fuelled a significant increase in student enrolment in African universities. Private HE, which in 2006 accounted for 22 per cent of HE students in Africa, is growing in many African countries due to major government policy reforms (**Nyerere et al., 2017**). This massification is leading to

⁶ Increasing enrolments in primary and secondary education in response to the EFA campaign have led to markedly increased primary and secondary enrolment rates (**Tlali, Mukurunge, and Bhila, 2019**)

In over a dozen LACs, more than 40 per cent of students who enrol in HE do not complete a degree, either because they are still studying or because they have dropped out.

disproportionate ratios of students to lecturers (**Tlali, Mukurunge and Bhila, 2019**).

Students joining these institutions are faced with various challenges related to lack of resources, congestion, alienation and subsequent workload for academic staff. In Kenya, for instance, massification began in the 1990s; the government had to establish several universities and chartered private universities, with the aim of taking in students from secondary school in order to increase the pool of high-skilled labour for development (**Republic of Kenya, 1988; Mwirichia, Jagerob and Barchok, 2017**). However, the rapid growth of and enrolment in universities in Kenya has raised concerns among stakeholders regarding the quality of university graduates (**Kairu, 2014**). Something similar has happened in Botswana, Nigeria, Ghana and elsewhere in Africa (**Sawyer, 2004**). Nigeria is one of the African countries most affected by the overcrowding of HE, and the greatest effects were felt from 1998 to 2005. During this period, enrolment in

universities increased by 24 per cent, with challenges related to quality, poor infrastructure and poor student well-being, among other problems (**Tlali, Mukurunge and Bhila, 2019**).

The rapid expansion of the system in LACs, the characteristics of the new students, and perhaps the lax regulation of some HEIs has also raised questions about the quality of the programmes and, therefore, the equity of a system in which not all students have access to a high-quality institution (**Ferreyyra et al., 2017**). Indeed, in many countries, HE massification has been accompanied by a stratification of the system, between an ‘elite’ sector and the rest, which often comes with problems of quality. Thus, it is relevant to ask if HE’s massification has improved social mobility and skill levels.

Considering its outcomes, the system’s performance in LACs is disappointing. In over a dozen LACs, more than 40 per cent of students who enrol in HE do not complete a degree, either because



In most African countries, there is strong pressure to simultaneously increase access and improve quality in a context where resources are lacking and where there are still problems of corruption.

they are still studying or because they have dropped out (**Fiszbein, Cosentino and Cummins, 2016**). Only Mexico's and Peru's completion rates are near those of the USA (65 per cent). Also, students who enrol in and complete a degree often take longer than the stipulated time (**Ferreira et al., 2017**). In terms of quality, if we consider international rankings, only ten universities in LACs are among the world's top 500 HEIs (**Times Higher Education, 2020**).

In most African countries, there is strong pressure to simultaneously increase access and improve quality in a context where resources are lacking and where there are still problems of corruption (**Tlali, Mukurunge, and Bhila, 2019**). In response to historical conditions, the majority of public HEIs in Africa have enrolled students beyond their capacity, which has resulted in overcrowding and negative consequences for educational quality. Increased enrolment has allowed access to HE, but the important issue of ensuring equity in students' academic success has received limited attention

(**Tlali, Mukurunge and Bhila, 2019**). A study by the Harvard University Anderson Research Group (**HUARP, 2006**), based on country studies and a survey of African graduate students, estimated that, on average, only about 50 per cent of enrolled students in sub-Saharan Africa graduate.

There are several reasons for the high dropout and low graduation rates. Firstly, students, especially those from rural areas and low-quality secondary schools, are under-prepared academically. As enrolment increases, students from a wider range of socio-economic backgrounds and with different educational abilities are admitted into HE. This shows the importance of and the need for investment in quality primary and secondary education, which is necessary for learning throughout life. Secondly, many students from low socio-economic backgrounds, having enrolled in a programme, may find the tuition fees and living expenses unaffordable, especially if they do not receive any grants or scholarships. Thirdly, the frequent closure of campuses



due to student protests has resulted in the loss of a semester or even an entire academic year, leading to students' disinterest.

The other issue related to HE is financing. Policy decisions relating to tuition fees affect both the cost of tertiary education for students and the resources available to



tertiary institutions. Cost-sharing between public and private funding takes a number of forms – from no tuition fees, such as in Norway, to fees that may exceed the average annual family income, such as in competitive universities in the USA. Many countries try to set the tuition fees of public HEIs relatively low or free to assure equity. However, in cases where the socio-economic status (SES) of students in public HEIs is skewed to those of higher SES, HE may function regressively. In many East Asian countries, such as Japan, public HE has limited enrolment capacity, partly because governments are trying to maintain education and research quality among public HE institutions.

In several LACs, the ability of governments to expand access through public funding is limited. Most (but not all) Latin American public universities are currently tuition-free, leaving the financial burden of HE to the government. In cases where the majority of students in public universities come from

the wealthier middle classes, this funding is very regressive. Cost-sharing is sometimes implemented even within the public sector; alternatively, Latin American governments have supported students' educational costs through different combinations of grants and loans. Indeed, despite their relatively low income, low- and middle-low-income students have been able to afford private HE thanks to student loans and scholarships implemented in some countries (**Ferreira et al., 2017**). However, given the significant expansion of HE, one relevant question is whether the returns to future graduates' education will be enough to repay their loans.

Economic returns to HE show significant heterogeneity across study fields and HEIs (**Rodríguez, Urzúa and Reyes, 2016**). This heterogeneity in returns, even for the same field, can be explained by differences in students' academic readiness and SES, which implies that not all students have access to options of the same quality. Indeed, selective universities have the largest-earning payoffs, while

Recent experiences in Chile and Colombia show that increased access to low-quality HE in less-prepared students might lead to lower-quality jobs and social discontent.

low-selectivity institutions may have very limited or even negative returns (**Hastings et al., 2013**).

Therefore, attempts to increase social inclusion through access to HE can have only limited success in light of the heterogeneity of HEIs, students and programmes in the system. Recent experiences in Chile and Colombia show that increased access to low-quality HE in less-prepared students might lead to lower-quality jobs and social discontent. Consistent with the heterogeneity in returns, MacLeod et al. (2017) show, using data for Colombia, that college reputation is positively correlated with graduates' earnings growth; their results suggest that HEI reputation matters beyond signalling individual skill. Their results are consistent with the hypothesis that colleges add to skill and that their value-added varies systematically with their reputation. At the same time, as noted in **WG2- ch6**, there is a growing literature on the impact that technology is having on the job market and how it is causing some of the skills conferred by college majors to become

increasingly obsolete, reducing their economic returns.

In Africa's case, this rapid increase in enrolment is perhaps the most critical contributor to deteriorating quality because it has increased pressure on university funding, resulting in a lack of resources for key instruction inputs and research (**Tlali, Mukurunge and Bhila, 2019**). Massification has had negative consequences on almost all public HEIs in Africa, including physical infrastructure, staffing, educational quality, graduate employment and student mobility. In addition, the private sector has increased access to mainly small, low-quality institutions, which, in most cases, should not be called universities.

Several studies on African HE over the last ten years have delineated the sector's main features. By far, the most striking trend has been the sector's continuing expansion. For instance, in sub-Saharan Africa, the gross enrolment ratio for tertiary education grew, on average, 8.6 per cent each year between 1970 and 2008,



Recent research reveals a wide variety of high participation systems in HE, from highly differentiated vertical and horizontal systems, as in Japan, to homogeneous flat systems, as in Finland.

compared with the global average of 4.6 per cent (**Wachira, 2018**).

The finance of HE in Africa has undergone various changes. The main changes are associated with the involvement of the market in HE, the introduction of tuition and a reduction in ‘free’ universities. For some people, these changes imply a commoditized education, which seriously affects quality. The tuition fee in some cases covers the full economic cost, and in other cases, cost-sharing is implemented, whereby students meet the partial cost of their university education (**Oketch, 2016**). When tuition fees were first introduced in the 1990s in countries such as Kenya, Ghana and Uganda, there were significant demonstrations against this policy.

The decline in government funding for HE, along with the rising costs of different services and products that universities provide, has led to a steady increase in student outlay over the last decade. There are no indications that costs will go down, nor are there signals that

university education will be free again – as called for by some student associations. Higher Education South Africa admitted that tuition fees had risen annually, with variations among institutions, to keep pace with universities’ running costs (**Makoni, 2014**).

LACs have substantially increased the number of their high school graduates, which has been the main driver of HE’s expansion. The market has responded with the creation of new HEIs. There are pending issues in this new scenario to avoid student frustration, and increase equity, quality and productivity. Firstly, the quality of secondary education needs to be improved. Secondly, there is a need to establish support programmes for less prepared students. Thirdly, the existence of externalities, liquidity restrictions and information problems implies that the market alone will not allocate resources to guarantee an education that contributes to sustainable development. Thus, the provision of information and government regulation is necessary.

Through education, a country has greater capacity to build knowledge and generate innovation, which makes the economy more productive and social life in general more vibrant and open.

To what extent then is the expansion of HE sustainable and equitable? Recent research reveals a wide variety of high participation systems in HE, from highly differentiated vertical and horizontal systems, as in Japan, to homogeneous flat systems, as in Finland (Cantwell, Marginson and Smolentseva, 2018). In developing countries, the massification of primary and secondary education has fuelled a significant increase in the demand for HE, which is the result of rising social expectations, demand for the acquisition of social and cultural capital, and to a lesser extent, demand for HE graduate jobs. In general, high participation systems tend to reflect the socio-economic structure of the society to which they belong, generating a fragmented system with high SES students going to elite universities and middle and low SES students going to universities or HEIs of lower quality, with some even failing to complete university. Elite university credentials lead to huge benefits in terms of salaries and social status, while lower-tier university credentials bring

only few benefits, or none at all, generating strong frustration. From the perspective of social equity, students who graduate from top-tier universities, who generally come from high-SES families, have access to good jobs that pay several times what is paid to the people with low or no credentials. This gives them the opportunity to send their children to elite schools, and give them private tutoring and expensive test preparation so that they can easily get into the same top-tier universities. Hence, meritocracy increasingly fails to deliver on its promise of social mobility. Furthermore, students without access to elite institutions find that potential employers do not value their credentials, frustrating their legitimate aspirations for a better life through education; this has detrimental consequences for citizenship, social cohesion and human flourishing.

This highlights the need for and the importance of investment in quality basic and secondary education as a necessary condition for lifelong learning.



Comprehensive policies are also needed to ensure equitable and fair access to HE.

3.5 .4

IMPLICATIONS: HOW CAN EDUCATION ENHANCE HUMAN DEVELOPMENT?

There is a long tradition of viewing education as serving two contrasting purposes – human flourishing (or Bildung) on the one hand, and economic utility on the other. However, this opposition is simplistic. Education contributes to human flourishing in a number of economic and non-economic ways. In addition to its intrinsic value, education is associated with several benefits for individuals and society. It contributes to higher productivity and economic growth, and generates externalities – a more educated workforce fosters innovative ideas that lead to

more and better jobs. Through education, a country has greater capacity to build knowledge and generate innovation, which makes the economy more productive and social life in general more vibrant and open. Education also translates into greater civic participation levels in voting and volunteering, interpersonal trust and political efficacy, all of which help build better societies. Educated individuals are also likely to live longer and healthier lives (**Brunello et al., 2012**).

However, as we have shown in this chapter, the relationship between education and human flourishing is far from linear. Investment in education does not necessarily enhance human flourishing; in a number of contexts, it even serves to undermine it. Much here depends on the purposes as well as the political organization and social distribution of investment. We therefore conclude this chapter by highlighting a number of points to which policy-makers and other educational stakeholders should pay attention in order to ensure that education enhances

... the relationship between education and human flourishing is far from linear.

While increased access heightens aspirations for social mobility, many education systems are only able to offer quality education to a minority of students.

rather than limits human flourishing.

3.5 .4 .1

DISPARITIES IN QUALITY AND INCLUSIVENESS OF BASIC SCHOOLING

Over the last few decades, the world has experienced significant progress in terms of access to education. Driven, not least, by the EFA movement, school enrolment ratios and access to secondary education have risen. However, in many contexts, increasing access to primary and secondary education is associated with highly uneven schooling quality. Quasi-universal access does not mean that all children are provided with a solid educational foundation. While increased access heightens aspirations for social mobility, many education systems are only able to offer quality education to a minority of students. Further, many school systems are far from inclusive. While substantial progress has been made, much remains to

be done in terms of gender parity and ethnic and religious diversity. Additionally, other forms of diversity like disability and neurodiversity still tend to be neglected. Teaching to these forms of diversity is under-resourced and under-researched and this may in turn increase educational disparities (**WG2-ch4**).

3.5 .4 .2

QUASI-MARKETS AND EDUCATIONAL EQUITY

In response to the financial strains and perceived inefficiencies of public education systems, many governments have introduced quasi-markets as new forms of educational governance that claim to make educational organizations more efficient, responsive and innovative by exposing them to market pressure. Indeed, since the 1980s, more and more countries have introduced scope for parents to choose the school to which they send their children. The most relevant policies to encourage school choice are vouchers and



charter schools. In general, the effects of these policies vary depending on the context and policy design, including the nature of the incentives that private actors face, and government regulatory capacity. However, the available evidence shows that quasi-markets introduce a wide range of challenges related to educational equity, socio-economic segregation, school segmentation and public accountability (Epple, Romano and Urquiola, 2017; Verger and Moschetti, 2017).

3.5 .4 .3

INEQUITIES IN EXPANDING HIGHER EDUCATION

The increasing enrolment in primary and secondary education in developing countries, as a response to the EFA campaign, has not only led to an increase in completion rates for secondary education, but also to an expansion of HE. This expansion means, on the one hand, that new students who are less academically prepared and from

middle-low and low-income groups are attending HE. On the other hand, existing institutions have been overcrowded or new (private) HEIs have been created to accommodate these students. All of which raises questions about funding, quality and the equity of a system in which not all students have access to high-quality institutions. In this new scenario comprehensive policies are needed to ensure equitable and fair access to HE, and to avoid student frustration. Some of these include improving primary and secondary education, establishing support programmes for less prepared students, and an active role for governments in regulating the system.

3.5 .4 .4

CREDENTIALISM, MERITOCRACY AND SOCIAL STRATIFICATION

In most countries, expansion of access to HE has led to credentialism. As differential educational attainment (justified by the ideology of meritocracy)

In all societies, parents' educational background and SES remain strongly predictive of children's educational attainment.

becomes the basis for allocation to differential social positions, new forms of social stratification are created and consolidated. Educational attainment increasingly becomes a positional good strongly associated with social and economic status. One problem here is that meritocracy increasingly fails to deliver on its own promise of social mobility. In all societies, parents' educational background and SES remain strongly predictive of children's educational attainment. Therefore, educational attainment as a positional good tends to reproduce existing hierarchies of social and economic status. Just as importantly, the growing dominance of a meritocratic conception of education tends to sideline other and even more fundamental aspects of education. Thus, the expansion of HE may become more reflective of social struggles for status than a process by which people and societies can achieve their full potential and promote sustainable development by being creative and learning to live together with nature in peace and harmony. Similarly,

rising educational levels may become more reflective of social competition than a way for people to acquire the knowledge and skills needed by contemporary labour markets. In this sense, credentialism and meritocracy may undermine the most crucial purposes of education.

3.5 .4 .5

RETHINKING SKILLS

Educational investment does not, in any linear fashion, entail rising skill levels. Owing to a range of factors, from underfunding to credentialism, education systems around the world struggle with various forms of 'skills gaps' or 'skills mismatch'. For instance, there is a wide gap between the required skills and competencies in many African countries (**World Economic Forum, 2017**); also, one in three working-age persons in LICs and LMICs lacks the skills needed to secure quality employment (**World Bank, 2020**). In the Global North, the problem is



There is an urgent need to provide children with the necessary skills to achieve their full potential so that they may contribute to a productive and fair society.

one of skills mismatch; according to the OECD (2019a) skills mismatch affects 20 per cent of employees in OECD countries. In addition, most members of the workforce do not participate in lifelong learning and continuous retraining, which is a problem since it is expected that, in a short period of time, available jobs will be in roles that do not yet exist.

There is an urgent need to provide children with the necessary skills to achieve their full potential so that they may contribute to a productive and fair society. Thus, compulsory education must ensure that those who finish school have the cognitive and non-cognitive skills necessary to be successful in contemporary societies. However, to be successful is not just a matter of meeting the skills requirements of labour markets. If non-cognitive skills are in dire need today, this is not just because creativity is needed for knowledge-intensive jobs. Many of humanity's current concerns, from climate change and trade, to the effects of the pandemic, social exclusion and the advancement

of science, require that people be educated to understand, engage and have the right skills to approach problems collaboratively, from their respective domains of activity. Education must develop skills that are not exhausted in the cognitive field. We need to educate people who can work with others in search of solutions to complex problems that cannot be solved with just one type of knowledge. Solving complex problems requires an interdisciplinary approach and for this, intra- and interpersonal skills, such as teamwork, the ability to communicate ideas and the ability to listen to others are essential, so empathy is vital. Building these skills requires quality education and lifelong learning (OECD, 2019b; Reimers, 2020).

Nonetheless, the question of skills formation and distribution should never be reduced to a technical issue of achieving a perfect match between the educational supply of skills and the demands of labour markets. Questions of skill should never be considered independently of questions of equity and ethics. This is because

Improving equity in education must be a high priority for all countries; equity in education goes hand-in-hand with quality and efficiency.

education should always serve human flourishing, but it is also because economic arrangements that neglect the question of equity can never be sustainable. Equity in education means that personal or social circumstances, such as gender, SES, ethnicity, migrant background, age, special needs or place of residence, do not hinder the achievement of their educational potential and that all people reach at least a minimum skill level.

Equity issues must be considered at all stages of learning, whether in early childhood, school, tertiary, or adult education and training. In addition, countries should pursue policies to avoid school segregation and ensure that children have the opportunity to learn, play and communicate with other children of different social, cultural and ethnic backgrounds; this is essential for social cohesion. Improving equity in education must be a high priority for all countries; equity in education goes hand-in-hand with quality and efficiency.

3.5 .4 .6

GLOBAL PATTERNS OF EDUCATION FINANCING

The world is not on track to meet the SDGs by 2030. While governments, households and donor countries are the main funders of education, increasing internal financing through economic growth as well as external aid are essential for achieving the goals. In recent years many countries have not been allocating enough resources to education; in particular, the poorest countries face significant difficulty in mobilizing adequate domestic resources. In addition, external aid has remained stagnant – only in 2016 did aid to education surpass the amount allocated in 2010.

In this context, the impact of the COVID-19 pandemic is an important obstacle for all financing sources. According to the World Bank (2020), in LICs and LMICs, the pandemic is



According to the World Bank (2020), in LICs and LMICs, the pandemic is expected to negatively affect planned increases in public education spending, stagnating in most countries and decreasing in some.

expected to negatively affect planned increases in public education spending, stagnating in most countries and decreasing in some. Also, the pandemic implies reductions in income and the need for greater health spending in many households, thus making it difficult for some families to cover education costs. Moreover, donor countries are suffering from a reduction in income as a result of slower growth and a reallocation of funds to combat the effects of the pandemic; thus, the volume of aid will likely be reduced. For this reason, it is essential, firstly, to maintain the proportion of total aid allocated to education. Secondly, there needs to be flexibility in the use of funds to finance initiatives to mitigate the effect on education of COVID-19, which has most severely affected the most vulnerable students, increasing inequality. Thirdly, multilateral bodies such as the GPE, rather than fragmented bilateral aid efforts, must be strengthened in order to increase development assistance to education. External aid must also be aligned with

the needs of national education systems to effectively strengthen them, and for this it is necessary to constantly provide contextualized support.

Further, the COVID-19 pandemic has resulted in a massive increase in the popularity of online teaching services and digital textbook providers, giving the private sector and commercial organizations a central role in essential educational services. This has meant the rapid growth of new business opportunities for the EdTech industry. Thus, it is important to perform a detailed analysis of the financial models and practices that have been implemented to finance the development and diffusion of EdTech during the crisis. Also, its long-term implications on public sector financing and the distribution of wealth in favour of a few corporate actors need to be studied (Williamson and Hogan, 2020).

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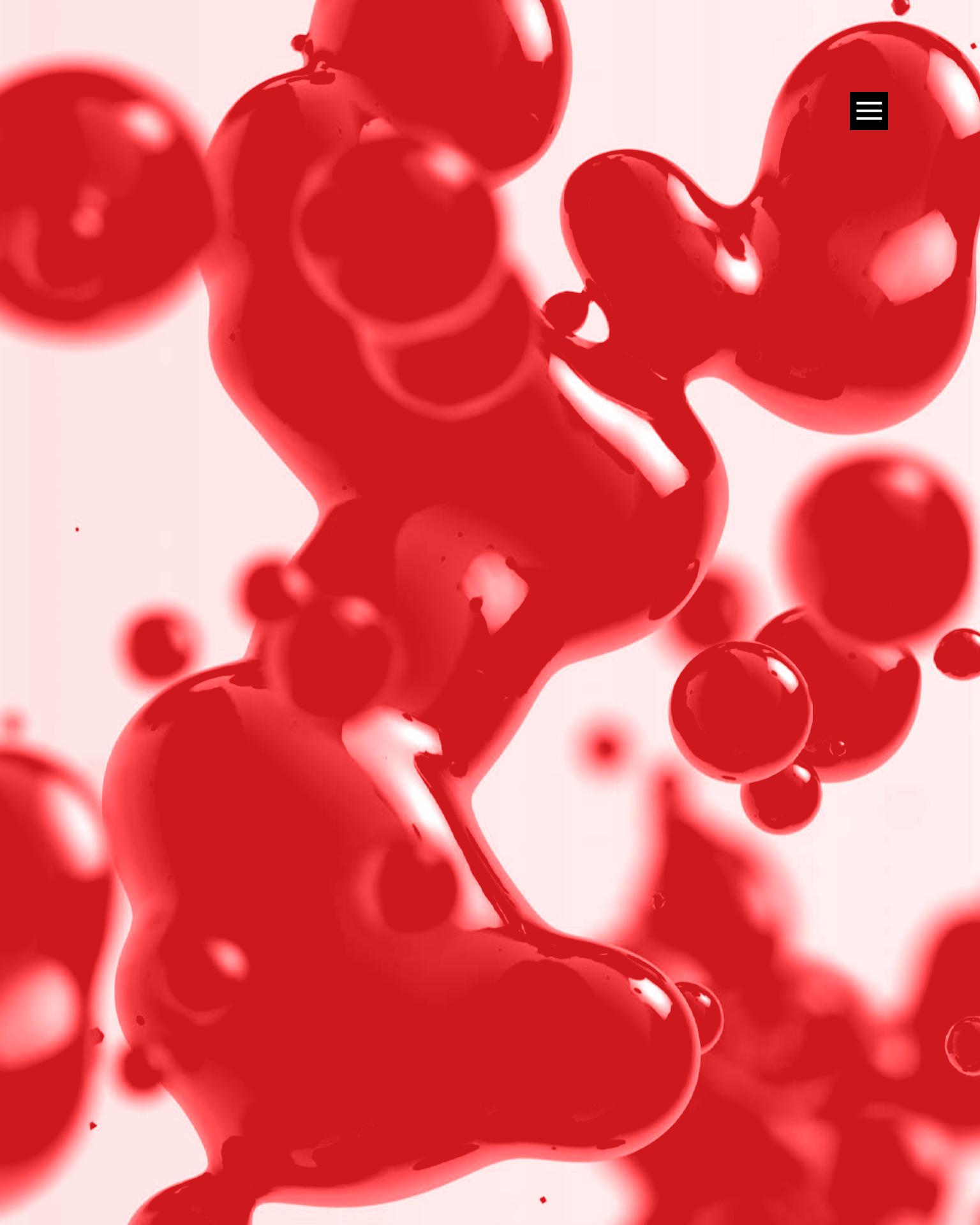
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C H A P T E R

4

Diversity and social justice in education

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This chapter assesses how education responds to diversity and interconnected inequality, and how these responses work towards human flourishing and social justice. It examines different forms of diversity, namely, race/ethnicity/language, religion, gender, sexuality, social class, disability and neurodiversity (i.e. learning differences); as well as how these intersect. Sexuality and neurodiversity are relatively recent additions to the diversity discussion. While officially advocating for ‘equal educational opportunities’, governments variously prioritize different forms of diversity, guided by historical, political, social and economic contexts. Measures to address diversity have names such as ‘multicultural’, ‘inclusive’, ‘human rights’ and ‘diversity and social justice’ education. Policy implementation varies across societies and can be enhanced by effective monitoring, increased funding and relative autonomy of local actors to interpret policies to suit local circumstances. Given the critical role that teachers play, teacher education programmes should prepare culturally responsive educators.

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4.1 Introduction

This chapter aims to assess two topics: (1) how education responds to different forms of diversity and interconnected inequality; and (2) how these responses work towards human flourishing and social justice. Diversity is defined as the

factors that make social groups and individuals differ from the majority, or what is perceived as ‘normal’. This chapter addresses race/ethnicity/language, religion, gender, sexuality, social class, disability and neurodiversity,



as well as intersectionality among diversity types (**Collins and Blige, 2016**). It examines diversity, inequality (structural, institutionalized and historically embedded) and oppression (racism, sexism, heterosexism, classism, ableism, etc.), which hinder full human flourishing (**WG1-ch1**) and social justice in pursuit of United Nations (UN) Sustainable Development Goals (SDGs) 4.5 and 4.7 (**UN, 2015a**).

This chapter addresses the following questions and is structured accordingly.

1. How do we best understand diversity, oppression and social justice in education?
2. How has education responded to diverse social groups (race/ethnicity/tribe/language, religion, gender, sexuality, social class, disability, neurodiversity)?
3. How have policies and practices prepared teachers to address diversity?

4. How have these responses addressed (facilitated and hindered) students' human flourishing and social justice? What are the implications and recommendations for policies and practice?

The chapter examines the following sources (evidence): (1) primary and secondary sources of policies and practices for selected countries (national, local and school levels) and the debates on relevant issues; (2) available survey statistics on school participation, achievement and other relevant indicators when available. These sources are examined cautiously, though we acknowledge that the chapter is filtered through the particular knowledge and experiences of the authors and reviewers. Categorizations of diversity groups are socially constructed, and the questions and designs for surveys and studies, and their dissemination, are affected by the political, economic and cultural environment of the research sites, data collection places and institutions.



4.2

How do we best understand diversity, oppression and social justice in education?

4.2 | 1

TYPES OF DIVERSITY

This chapter examines several types of diversity: race/ethnicity/tribe/language, religion, gender, sexuality, social class, disability and neurodiversity (learning difficulties). All of these categories are socially constructed and remain political, fluid and

contentious. Categories can be imposed from above (e.g. ethnic groupings in government surveys or approved lists, categories such as 'deaf' assigned as a result of a clinical assessment), or be self-identities that individuals develop often by being influenced by, and internalizing, the dominant society's categorization. Given the nature of diversity group categories, detailed descriptions for individual categories are discussed in respective group



Categories can be imposed from above or be self-identities that individuals develop often by being influenced by, and internalizing, the dominant society's categorization.

sections of 4.3. These groups are marginalized not because of their particular group features, but due to their relationship to the dominant group. For example, deaf persons are disadvantaged not because they are deaf, but because the structure and operation of society is based on hearing people as the 'norm'.

4.2 .2

UNDERSTANDING OF SOCIAL JUSTICE AND DIVERSITY IN EDUCATION

Social justice seeks both socially just goals and socially just processes. Many different understandings of social justice exist, across societies (Dien, 1982; Nader and Sursock, 1986), all centering on fairness, from diverse academic, cultural and theoretical perspectives (Reisch, 2014). Even within social justice in education there are multiple views (Ayers, Quinn and Stovall, 2009; Hytten and

Bettez, 2011). This chapter considers that social justice and diversity in education is best understood as two interconnected elements: (1) distributive justice; and (2) the content of the social good that is distributed (education). The main interest of the former is who gets how much of schooling, that is, equality in distributing the social good (e.g. educational opportunities and rewards). The latter is concerned with differences – how differences play out in deciding on and enacting what schools teach and what students learn at school, and with what consequences.

4.2 .2 .1

DISTRIBUTIVE JUSTICE: OPPORTUNITIES AND PARTICIPATION

Few people question the virtue of distributing education fairly. The system of education is a public asset funded by taxpayers. Individuals can benefit from schooling by gaining qualifications, knowledge and skills, and citizenship qualities,

Societies can benefit from the promotion of social cohesion and trust in public institutions through education.

enabling them to achieve their potential in adult society. Societies can benefit from the promotion of social cohesion and trust in public institutions through education. Education distribution can be indexed through school participation rates by age and retention rates to higher levels of schooling.

In distributing education, there are three principles to consider: ‘simple equality’ (Walzer, 1983); prioritizing the needs of the least advantaged; and merit-based distribution. Firstly, the ‘simple equality’ principle treats everyone in an identical manner in distributing education to a specified group, regardless of individual backgrounds, needs and attributes. This is variously referred to as ‘objective equality’ (Eckhoff, 1974) and the ‘equality principle’ (Schwinger, 1980). ‘A compulsory education for all’ derives from this principle.

The second principle, prioritizing the least advantaged (Rawls, 1972, p. 75), acknowledges the special needs of students deriving from their differences (and

advantages/disadvantages). This approach is variously termed ‘subjective equality’ (Eckhoff, 1974, p. 36), ‘humanitarian norms’ (Schwartz, 1975, p. 112), the ‘needs rule’ (Deutsch, 1975, p. 146) and ‘protecting the vulnerable’ (Goodin, 1985). Rawls’s ‘difference principle’ (1972, p. 75) sums up these approaches by stating that inequalities can be justified only when they advantage the least advantaged. This principle underlies practices of financial assistance and various forms of compensatory education and affirmative action programmes. The principle is linked to the simple equality principle and to merit-based distribution (see below). Without protection of the vulnerable, it would be difficult for all students to complete compulsory schooling. It would also be hard to distribute educational opportunities based on ‘merit’ or ‘achievement’ if students in minority groups (e.g. low-income families, ethnic minorities) were disadvantaged at the starting line, ‘stamped from the beginning’ (Kendi, 2017).



The nature of 'merit' typically includes academic performance and/or personal qualities such as leadership and participation in extra-curricular activities, but is often determined by the dominant group.

The third principle, merit-based allocation, guides the distribution of slots in higher levels of schooling and universities through the assessment of performance (e.g. academic). The basis of this principle is that opportunities for further study should be given to those who demonstrate the most potential to 'benefit' from them, and that rewards for 'merit' motivate individuals to achieve excellence (WG2-ch3). Merit-based distribution is variously called the 'performance principle' (Schwinger, 1980, p. 105), 'desert' (Walzer, 1983, p. 24) and 'equity' (Deutsch, 1975, p. 143). The nature of 'merit' typically includes academic performance and/or personal qualities such as leadership and participation in extra-curricular activities, but is often determined by the dominant group.

Education systems often employ these three principles simultaneously, to varying degrees according to country or locality (such as rural and urban). For example, some nations, often those in the Global South, may put more emphasis on

simple equality of achieving full participation in compulsory schooling, while others emphasize the latter two principles.

4.2 .2 .2

THE CONTENT OF SCHOOLING: THE POLITICS OF DIFFERENCE

Educational experiences entail not only what schools explicitly teach but also what students actually learn – the explicit, implicit, hidden, null, learned, taught, tested curricula (Eisner 1994, pp. 87–107). Eisner posits 'that what is omitted from the school curriculum – what is called the null curriculum – is every bit as important as what is left in' (1994, p. 81) – the explicit curriculum that is written, published, often standardized, and tested. An examination of what schools explicitly teach involves lines of philosophical thinking, incorporating 'politics of difference' (Young, 1990) or 'cultural recognition' (Fraser, 1995), and cultural identity politics (Adams, 2016; Adams and Bell, 2016;

... mainstream schools tend to provide curricula that reflect the dominant group's worldview, normalize it as universal, and advance the dominant group's interests while marginalizing minoritized groups.

Bell, 2016; Sensoy and DiAngelo, 2017). Social justice can be evaluated in terms of economic distribution, cultural recognition and political representation (**Fraser, 2005, pp. 74–75**). The politics of difference and distributive justice can be understood, respectively, as opposing cultural and economic approaches to social justice (**Olsen, 2001, p. 6**). The economic approach centres on distributing social goods equitably and is satisfied with merit-based allocation with some modifications to assist the disadvantaged; it neither questions the 'neutrality' of assessment nor suspects that the distributed goods are impartial to certain social groups.

Questioning of the content learned in school draws on a range of critical theories and builds on studies of minoritized groups (e.g. classism, ableism, sexism, heterosexism, racism). These critical theory studies argue that mainstream schools tend to provide curricula that reflect the dominant group's worldview, normalize it as universal, and advance the dominant group's interests while marginalizing

minoritized groups (e.g. women, people of colour, the poor, religious minorities, the disabled, non-heterosexuals). For example, in settler anglophone societies like Australia, schools taught the white settler's version of history, until challenged in the 1980s, and normalized the value of the English language and the anglophone worldview above others (e.g. Welch et al., 2013; **WG2-ch5 and WG2-ch8**). Schools socialize and enculturate students in such a way that they often assume that what they learn at school by interacting with peers and teachers is normal (**Bourdieu and Passeron, 1990**). Students thus learn that they may have to play by the rules set by the dominant group if they aspire to achieve academically and 'succeed' in mainstream society.

In recognition of diversity and inequality, advocates call for the inclusion of minoritized groups' worldviews in determining the school curriculum, assessment and selection criteria, and pedagogy (in organizing teaching and learning). Connell (1993) proposes 'curricular justice', arguing that minoritized groups' worldviews



Meritocracy is an ideology, often advanced by the dominant group, which sees students as having equal opportunities to succeed through their individual effort, talent or merit

should receive greater weighting in order to counter the existing ascendancy of the dominant group (**see Lea and Helfand, 2006; Stewart, 2019**). While the above discussion emphasizes structural and cultural forces affecting diversity and related inequality, there remains the potential for individual ‘capabilities’ (the freedom to achieve what an individual considers valuable), but they are not often evaluated in conventional assessment (**Walker and Unterhalter, 2007; Sen, 2009; Deardorff and Arasaratnam-Smith, 2017**).

While the distribution of educational opportunities can be indexed by school retention rates, social processes and content in schools are more difficult to measure. The subtle manifestation of the politics of difference (of social groups) in what occurs at school can be elusive and more distant from common assessments of educational outcomes. These manifestations include prejudice (learned pre-judgement and views about members of other social groups based on limited experience with those groups),

discrimination (actions based on prejudice) and oppression (discrimination embedded in and supported by institutional systems, power and ideology, such as racism, sexism, ableism, classism, etc.) in what occurs at school.

Meritocracy is an ideology, often advanced by the dominant group, which sees students as having equal opportunities to succeed through their individual effort, talent or merit (**Young, 1958, 2001**). From this perspective, each individual ‘earns’ what they deserve and no one is structurally advantaged, a claim rejected by those who insist on the prevalence of ‘white privilege’ (**McIntosh, 2001; Wildman, 2006**) or dominant-group privilege. Children of different social groups have unequal access to resources (material, cultural and social) even before starting school. Curricula, learning strategies, language and interaction patterns, and assessments at schools are more familiar to children from dominant group families (e.g. middle/higher class of the dominant, privileged culture) and facilitate these children’s learning. A challenge remains in designing



4.3

How has education responded to diverse social groups?

Educational policies and practices provide the context for student learning and flourishing. How has education responded to different forms of diversity, including their intersectionality? Education to address diversities has explored curricula ranging from a liberal approach (spanning assimilation, the celebration of cultural difference and intercultural understanding), to a critical approach (which emphasizes institutionalized and structural marginalization based on cultural differences), to a reclaiming youth approach focused on youth development to counter alienation and connect with traumatized

youth (**Brendtro, Brokenleg and Van Bockern, 2019**). Contemporary policies and practices often involve elements of different approaches, depending on specific contexts. These approaches include multicultural education, critical multiculturalism, critical consciousness, anti-racist education, intercultural education, ‘inclusive education’, ‘human rights education’ and ‘diversity and social justice education’ (**Banks, 2004, 2010; Sleeter and Grant, 2008; May and Sleeter, 2010; Grant and Portera, 2011; Adams and Bell, 2016; Gollnick and Chinn, 2016**), as well as indigeneity and decolonial resistance (e.g. **Battiste**



and Youngblood Henderson, 2000), and anticolonial education (Dei and Demi, 2021) and reclaiming youth (Brendtro, Brokenleg and Van Bockern, 2019). Such programming can extend positive benefits: critical consciousness, for example, addresses the development of social analysis, political agency and social action in students, and has been linked to improved academic outcomes and engagement (Seider and Graves, 2020).

Educational policies and practices provide the context for student learning and flourishing. How has education responded to different forms of diversity, including their intersectionality?

UNESCO's Global Citizenship Education (UNESCO, 2015a) is inclusive of these different approaches mentioned above. Based on human rights, global citizenship education aims 'to be transformative, building the knowledge, skills, values and attitudes that learners need to be able to contribute to a more inclusive, just and peaceful world' (UNESCO, 2015a, p. 15). It involves three interrelated domains of learning, that is, cognitive (informed and critically literate), socio-emotional (socially connected and respectful of diversity) and behavioural (ethically responsible and

engaged), in order to advance common objectives of the various approaches. These approaches are applicable in pursuing the UN SDGs, a blueprint for peace and prosperity for people and the planet now and in the future (UN, 2015). The goals most relevant to diversity and social justice in education are: no poverty (Goal 1), quality education (Goal 4), gender equality (Goal 5), and peace, justice and strong institutions (Goal 16).

4.3 .1

RACE, ETHNICITY, LANGUAGES (INCLUDING INDIGENOUS PEOPLES IN REMOTE AREAS)

Most countries in the world now include multiple racially, ethnically and linguistically minoritized groups, each having different histories in their

Languages (including dialects) are an important property and identifier of ethnic cultures.

relationship with mainstream society. Estimated proportions of ethnic minorities range from lower estimates of 1 to 4 per cent (e.g. South Korea, Hungary) (**Sugimoto, 2021, p. 33**) to higher proportions of 50 per cent in Australia (**Australian Bureau of Statistics, 2016**). How governments respond to diversity in education reveals different priorities in their unique political, social and economic context. While some indigenous peoples now participate in mainstream society, others reside in remote communities. The latter are referred to by different names such as 'Scheduled Tribes' in India and 'remote Indigenous tribes' (suku terasing) in Indonesia (**Chakaravarty, 2001; Joshee and Sihna, 2009**). Languages (including dialects) are an important property and identifier of ethnic cultures. Other marginalized groups that are considered culturally distinctive include 'Scheduled Castes' in India, descendants of the pre-modern class system (buraku people) in Japan (**Okano and Tsuchiya, 1999**) and Roma, also called Romany (or Gypsies, considered pejorative), an ethnic

group of traditionally itinerant people who originated in northern India and entered Europe by the tenth century CE.

These minority groups share experiences of marginalization in mainstream society and in education, but their experiences vary, at least partially due to the terms and nature of a group's initial contact, and its subsequent historical and contemporary relationship, with the dominant group. The terms of initial contact broadly fall into the categories listed below. Given that these categories are analytical constructs, some groups fall into multiple categories, illuminating intersectionalities across time and contemporaneously. The nature and extent of marginalization varies, with extreme forms involving genocide.

1. Colonization of Indigenous peoples in the land where the settlers continue to be dominant (e.g. United States (US), Canada, Latin America, Australia, New Zealand).



Ethnic Korean migrants to the USA have moved up in the dominant society quickly in contrast to ethnic Koreans in Japan, who have internalized the long-lasting colonial perception of themselves and their limited life opportunities.

2. Colonization that resulted in the colonized becoming resident in the colonial rulers' home territories (e.g. South Asians in the United Kingdom (UK), Koreans in Japan, Mexicans in the USA).
3. The slave trade, which saw those of African origin as commodities, resulting in their dehumanization and oppression in white settler societies.
4. Conflict or warfare between nations leading to the losers' marginalization.
5. Refugees escaping from oppression in their homelands.
6. A legacy of state policy (e.g. Jews in Europe, back Africans in South Africa, Tutsi in Rwanda).
7. Historical exclusion (e.g. descendants of the Buraku outcastes in Japan, Roma).
8. Recent migrants arriving as guest workers and permanent residents in pursuit of better lives.

These groups became minoritized, not because of particular cultural characteristics, but due to the

nature of their relationships with the dominant group in the society. These relationships were initially influenced by the Social Darwinist view of a colour-based hierarchy in the early twentieth century. In explaining variability amongst ethnic minority performance in the dominant schooling and beyond, Ogbu and Simon's (1998) ecological model explains that 'voluntary minority groups' (e.g. migrants) are more successful than 'involuntary minorities' (e.g. African-Americans in the USA), because the former enter the host society in pursuit of better life chances for their children, while the latter, due to their long experience of oppression, internalize the dominant perception of their marginalization. The same ethnic group can follow different paths, depending on the nature of contact. Ethnic Korean migrants to the USA have moved up in the dominant society quickly in contrast to ethnic Koreans in Japan, who have internalized the long-lasting colonial perception of themselves and their limited life opportunities.

BOX 1: INDIGENOUS SCHOOLING IN REMOTE PARTS OF INDONESIA

Isolated Indigenous tribes inhabit remote areas of Indonesia, including Baduy in Banten and Dayak in West Kalimantan. In some of these areas, only primary schools exist, with some still lacking government (public) schools. Government schools adopt the national curriculum, but not as closely as in cities. Orang Rimba (people of the jungle) communities only have access to non-governmental organization (NGO) outreach schooling programmes (*Manurung, 2019*). Teacher absenteeism remains high due to geographic locations, small incentives and/or lack of supervision. Teachers use mixed languages in instruction, namely, the national language (Bahasa Indonesia), and the local language, but those from outside the region use only the former. Students are

often absent during harvesting seasons as they help their parents in rice fields or other plantations, with principals reporting that 74 per cent of students attended schools during these times (**World Bank, 2019, p. 32**). The primary school participation rate in rural areas (98.78 per cent) is comparable to that in urban areas (99.62 per cent), but the gap is greater for secondary schools, with 67 per cent participating in remote areas and 76 per cent in urban areas (**Badan Pusat Statistik, 2019, p. 46**). Although many parents support children's schooling, some see it as a family burden (**World Bank, 2019**). Raihani (one of the authors of this chapter who studied the remote area as part of a World Bank project)¹ saw that some school buildings were ruined, and that almost half of schools had no library or staff room.

¹Raihani was involved as a senior qualitative research consultant in the cited World Bank (2020) study leading several groups of researchers conducting qualitative research in remote areas in East Nusatenggara and West Kalimantan, Indonesia, from 2016 to 2018.



Unsealed roads connecting communities and schools are common, making children's access difficult during the rainy season; many surrounding villages had neither electricity nor internet connection. The Indonesian Government has strived to improve education in remote areas, with the support of external funding agencies

such as the World Bank and the Australian Government's Department of Foreign Affairs and Trade. One notable initiative provides a financial incentive to remote area teachers (KIAT Guru Program), which aims to enhance teacher attendance and community participation (**Gaduh et al., 2020; World Bank, 2020**).

Most countries officially advocate the goal of equal educational opportunities for all citizens regardless of racial, ethnic and linguistic heritage, at least in their constitutions or in other legislation (**Stevenson and Dworkin, 2019**). Beyond that, countries display different patterns in formulating specific policies to advance the goal, and in practices at the programme level; we next describe three types.

The first is settler societies where the initial settler institutions (including schooling) continue to be dominant (e.g. US, Canada, Australia and New Zealand).

These societies often include multiple minority groups, indigenous First Nations peoples, voluntary migrants and refugees, and descendants of African heritage resulting from the slave trade (USA). The New Zealand Government prioritizes the indigenous Maori people over other minority groups and has pursued a bilingual and bicultural approach. In Australia, the Federal Government established a national multicultural education policy in order to integrate a large number of post-war migrants of non-Anglo heritage in the 1970s, which by the 1990s saw the academic performance of migrants become

Australian Indigenous peoples chose not to be part of the policy push from the beginning by emphasizing their special status as original inhabitants and advocated anti-racism education.

comparable to that of their Anglo peers. Australian Indigenous peoples chose not to be part of the policy push from the beginning by emphasizing their special status as original inhabitants and advocated anti-racism education. Australia's current funding priority is Indigenous peoples' schooling. Canada also includes Indigenous peoples and migrants, while the state of Quebec runs two streams of schooling to cater to francophone and anglophone communities. In the US, research on racism in education has centred on African Americans and migrants from Mexico and Central and South America.

The second pattern is a nation-state built on a former colonial territory that includes many indigenous groups within its borders. The national identity rests with the shared colonial experience of oppression rather than with the shared pre-modern 'traditional' cultural traits of the original inhabitants (e.g. Indonesia, Malaysia, India, francophone countries in Africa). In these cases, national governments

advocate unity in diversity (race/ethnicity, languages and religion), and consider schooling as crucial in nation-building projects as a means to foster national identity among people who have long maintained their immediate ethnic group identity. Some of these countries have adopted a local language (from amongst many existing ones) as the medium of instruction, while others continued to rely, to differing degrees, on the colonial languages of the past. After independence, Indonesia adopted Bahasa Indonesia, a local creole, as the national language and the medium of instruction in all schools, and continues to foster multicultural inclusive citizen identity (**Raihani, 2014**). Malaysia initially adopted English, then Malay, and more recently adjusted to adopting both. India adopts local languages at the primary school level, and adds English and Hindi at the secondary level, with tertiary education conducted in the latter two. Due to a lack of enabling resources, francophone Africa continues to use French in schools, although



UNESCO recommended the use of local languages (**Alidou, 2009**). South Africa continues to address the legacy of the apartheid system (**Essack and Hindle, 2019**). In contrast to the above societies, in the former colonies of Spain and Portugal in Latin America, a substantial proportion of the population are of European origin, which has created a different scenario. Latin America is characterized by significant social and economic inequality based on ethnic origins, namely, European-

origin, Indigenous-origin and African-origin. Race and ethnicity are strongly connected with social classes (**Torres, 2001; Carnoy, 2009**).

The third pattern is where a country has an obvious dominant ethnic group with a relatively small scale of ethnic diversity. These countries also have indigenous peoples and migrants, and have used education as a vehicle to integrate others into the mainstream society defined by the

Some governments have clear national policies on multiculturalism in education, while others have largely left such policies to local governments, with the national curriculum guidelines advising culturally appropriate content.

dominant culture and language (e.g. Japan, Korea, China, France, Germany and other continental European countries). Some governments (e.g. Korea, Taiwan) have clear national policies on multiculturalism in education, while others (e.g. Japan) have largely left such policies to local governments, with the national curriculum guidelines advising culturally appropriate content (Okano, 2019).

Continental European countries use the term ‘intercultural education’, encouraging mutual understanding of differences in order to promote social cohesion (Santos-Rego and Perez-Dominguez, 2001; Grant and Portera, 2011), but also pursue similar goals to those stated in critical multiculturalism (Reisel, Hermansen and Kindt, 2019).

Many governments initially supported assimilation of minority groups, but later shifted to advocating liberal multicultural policies that celebrate and ‘accommodate’ differences and ‘integrate’ diverse populations, by resorting to the rhetoric of ‘social cohesion’. In response to minority

groups’ demands for equity, the governments provide affirmative action programmes to specific groups (e.g. for Indigenous people in Australia to enter universities) and group-targeted resource assistance to facilitate retention and increase participation in higher levels of schooling. Some policies advocate culturally appropriate schooling for all students by including minorities’ perspectives and knowledge in the curriculum. These moves derive at least partially from the increasing number of migrants over the last four decades, heightened awareness of human rights and related debates elsewhere. Approaches have thus moved from assimilation to liberal multicultural education, and then to critical multiculturalism, which questions the taken-for-granted assumptions of mainstream practice.

As seen above, governments have taken different approaches in deciding the language used for the medium of instruction (the dominant language in most cases), often leaving minority



Figure 1: Linguistic diversity index, 2017

Colour scale indicates increasing levels of linguistic diversity with increasing intensity of green.

Source: Simons and Fennig (2017)

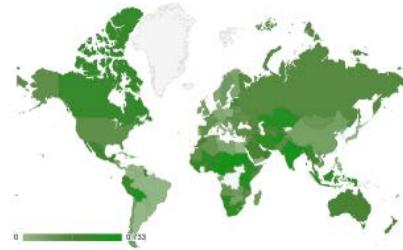


Figure 2: Cultural diversity index 2003

Colour scale indicates increasing levels of linguistic cultural diversity with increasing intensity of green.

Source: UNESCO (2009)

languages further marginalized. Policies and practices regarding minority languages in education vary across countries. In Australia and New Zealand, students can learn some minority languages as modern languages or in bilingual programmes in mainstream schools, as well as at community-run heritage language schools outside school hours (**WG2-ch10; WG3-ch6**).

Quantitative surveys reveal that minority groups' participation in schooling, in terms of retention to higher grades of education, has increased to varying degrees across countries. It is difficult to make cross-national comparisons because of a lack of reliable

comparable data (due to differing definitions of groupings and data collection methods) (**Dicks, Dronkers and Levels, 2019**). In Indonesia and Japan, educational participation and achievement data based on ethnic groups are not collected since this information is considered inappropriate and sensitive (**Okano, 2021**). The international assessment PISA (Programme for International Student Assessment) reveals that students with a migrant background (first and second generations) underperform compared to those without, except for Australia for both first and second generations, and Israel and Hungary for second generations (**OECD, 2010**).

Some policies advocate culturally appropriate schooling for all students by including minorities' perspectives and knowledge in the curriculum.

4.3 .2

RELIGIOUS DIVERSITY

Education addresses religious diversity via three approaches of religious learning: (1) learning into religion; (2) learning about religions; and (3) learning from religions (Grimmitt, 1987). Learning into religion is confessional in nature, meaning that people learn religion to nurture strong faith and to become committed in the learned religion. Learning about religions means studying religions to gain an understanding of different tenets. Learning from religions involves students learning valuable messages from diverse religions.

In secularized and increasingly diverse countries like many in Western Europe, religious education was initially considered a ‘private matter’, which led states to refrain from interfering (Rothgangel, Jackson and Jäggle, 2014). Recent developments,

however, show that there is a move towards religious education as either compulsory or optional subjects in public schools. This move is underpinned by the cultural argument that ‘regardless of the truth or falsity of religious claims, religion is a part of life and culture and therefore should be understood by all citizens as part of their education’ (Jackson, 2014, p. 22). It is a shift from confessional approaches to religious education to education about various religions in order to understand the contribution of religions to the development of society. Private schools, however, design religious education to cater to parents’ desire to maintain their religious tradition, even though it appears problematic for schools with a religiously heterogeneous student body. In some contexts, therefore, the confessional religious education incorporates an inclusive understanding of religions to promote intercultural or inter-religious dialogue. Private schools generally receive partial funding from the state, even though in a few cases, for example, England, they are fully state

Learning about religions means studying religions to gain an understanding of different tenets.

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In some contexts, therefore, the confessional religious education incorporates an inclusive understanding of religions to promote intercultural or inter-religious dialogue.

funded (Jackson, 2014, p. 43).

The Netherlands and Ireland represent two different approaches to religious diversity in Western Europe. In the highly secularized Netherlands, as stated in its Constitution (**Article 23, Clause 3**), public schools are neutral places, representing respect for every individual's religion and faith, but can opt to provide confessional religious education for children (Shadid and Koningsveld, 2006, p. 76). Denominational schools (e.g. Catholic, Christian, Islamic and Jewish) teach pupils into religion, although in some private Catholic schools, pupils of no religion form the majority and those of non-Catholic faith are largely diverse. In these schools, religious education teachers combine education about and from religion by inviting students to engage in dialogue to learn religious concepts, beliefs and values (Van Dijk-Groeneboer, 2017). Article 23 of the Constitution of the Netherlands also guarantees 'statutory equality' between public (government) and non-government schools; both

types of schools are funded by the government according to identical and equivalent criteria. In practice, however, issues with pupil selection, staff selection and curriculum in religious schools remain a challenge to religious freedom and liberal equality (Maussen, 2014; Maussen and Vermeulen, 2015). The most serious educational disparity is access to quality education for those of immigrant background. In the Netherlands, 'black schools' is a term commonly used to refer to schools established by and for immigrants with at least half of students from immigrant origins (Shadid and Koningsveld, 2006, p. 77). In 2006, migrant students had limited access to secondary and higher education compared to native Dutch: 16 per cent to 24 per cent in HAVO (higher general preparatory education) and 10 per cent to 18 per cent in VWO (preparatory scientific education) (Shadid and Koningsveld, 2006, p. 77). In 2014, students of immigrant background from Islamic schools had lower final test scores than those from public, Catholic and neutral non-public schools (Dronkers, 2016, p. 11).

**Religious education
is compulsory
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In Ireland, religious education mainly occurs in primary schools, and is publicly funded (**Rothgangel, Jackson and Jäggle, 2014**). More than 90 per cent of the schools are Catholic denominational, while the rest are mostly affiliated with Protestantism or other minority faiths such as Islam and Judaism (**Faas, Darmody and Sokolowska, 2016**). Although religion class takes up only half-an-hour per day, Ireland's primary schools are said to be permeated with religious beliefs and values during the school day (**O'Mahony, 2012, p. 162**). The Constitution and government policy support confessional religious learning, and since Catholicism is imposed in most primary schools, parents of other religions have limited options. More recent policies on religious instruction have accommodated minority students by allowing them to not attend Catholic religion classes (**Ireland Department of Education and Skills, 2018**), but a gap has existed between such policies and their implementation in schools (**Faas and Fionda, 2019**). Data are unavailable on educational achievement from different religious backgrounds.

Religious education is compulsory in countries like Indonesia that view religion as integral to citizenship. Indonesia advocates 'unity in diversity' without conferring official-religion status on Islam, although Muslims constitute over 87 per cent of its population (**Indonesia Badan Pusat Statistik, 2010**). Religion must be taught in all levels of schooling, both public and private, as mandated by the National Education System Law Year 2003. All schools must provide confessional religious instruction in the faith to which students belong, conducted by teachers of the same religion (**Kementerian Pendidikan Nasional, 2003**). Before its implementation, Christian schools challenged this policy, seeing it as a restriction on religious freedom, but most parents and teachers supported its implementation. Private schools (e.g. Islamic, Catholic, Hindu) were concerned as they considered it incompatible with the confessional mission of their schools and argued that it would be impractical to provide religion teachers for the schools' minority groups (**Hoon, 2013, 2014**;



Raihani, 2014; Birch, 2017). Private schools receive partial funding from the government to cover their operational costs.

4.3 .3

GENDER

Interest in gender and schooling previously focused on girls' disadvantages, with renewed interest in boys' experiences and masculinities since the 1990s (Skelton, Francis and Smulyan, 2006) and in non-binary genders.

Gender affects individual experience, in combination with other diversities and historical contexts (Francis, 2006; Villa Lever, 2018).

Gender-mainstreaming entered international politics through the actions of NGOs and multilateral agencies in the 1990s. The Beijing Declaration and Platform for Action in 1995 raised awareness of international concerns about gender-based discrimination in education, and the goal of providing universal access to, and ensuring the completion of, primary education for girls and boys. The United Nations

Gender affects individual experience, in combination with other diversities and historical contexts.

Millennium Development Goals (MDGs) set the goal of eliminating gender disparity in primary and secondary education by 2005, and in all levels of education no later than 2015 (**MDG 3**). While progress has been made globally in achieving both goals, this progress remains geopolitically uneven (**UNESCO, 2015b**), to a lesser extent beyond primary education. The UN proposed the 2030 Agenda for Sustainable Development in 2015, which presented in its fourth goal the need to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The goals are for students to have gender equality in access, retention and learning; for teachers and administrators to adopt gender-responsive curricula, learning materials and teacher training; and gender equality and gender-responsiveness for leadership, governance, operations and financing of the education system itself, including the government, local education groups, school management committees and other interfaces with local

communities (**Global Partnership for Education, 2016**). Gender equality is also viewed as impacting other SDGs, including economic growth, health, nutrition, agricultural productivity and reduced inequality.

Gender parity in enrolment in primary education has been achieved in two-thirds of the world's countries (**UNICEF, 2020a**). Global North countries have better indicators regarding gender equality in education, but there remain substantial numbers of primary school-age girls without access to school (**UNICEF, 2020a**). Educational policy and curricular documents in Iran and Uzbekistan make no reference to gender equality, while those in East Asia, South-East Asia and Central Asia make scarce reference to gender equality (**UNESCO MGIEP, 2017**).

In the Global South, the development agenda includes reducing gender inequality in schooling, and addressing sociocultural factors that hinder girls' education such as forced child marriage and child and



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teenage pregnancy. Every year, 12 million girls are victims of forced marriage (**UNDP, 2019**), a most acute issue in South Asia, sub-Saharan Africa and parts of Latin America and the Caribbean (**UNFPA, 2020, p. 97**). Girls' early school leaving often comes just before or after early marriage, or in the wake of pregnancy (**UNESCO, 2019, p. 25**). In the Dominican Republic, rural women in the poorest quintile with no more than a primary education are more than four times as likely to be child brides as urban women from the richest quintile with a secondary education or higher (67 per cent compared to 16 per cent) (**UNICEF, 2019, pp. 8–9**). These girls are victims of a human rights violation, are alienated from their families and social networks, are at high risk of experiencing domestic violence and have limited choices because of reduced chances of completing formal schooling (**UNDP, 2019**). A study of six Latin American and Caribbean countries (**PLAN and UNICEF, 2014**) reveals that poorly educated teenagers are five times more likely to become mothers.

Comprehensive sex education is one measure to raise girls' educational participation, by preventing unwanted teenage pregnancy, forced marriage and other forms of gender violence. But sex education still encounters many obstacles in countries with conservative and religious leaderships, which are not willing to move beyond promoting abstinence and fidelity (**Yankah and Aggleton, 2017**). There are strong links between religiosity, anti-abortion policies and increased levels of teenage birth rates (**Rasmussen, 2017**). Globally, conservative reactionary groups have mobilized against what they call 'gender ideology' to oppose sex education in schools, gender identity laws and gender mainstreaming in education (**Correa, 2017; Corredor, 2019; Troncoso and Stutzin, 2020**).

Worldwide, almost one in four girls between 15 and 19 years of age are neither employed nor in education or training (NEET), compared to one in ten boys of the same age (**UNICEF, 2020b**). This difference is greater in Africa

Globally, conservative reactionary groups have mobilized against what they call ‘gender ideology’ to oppose sex education in schools, gender identity laws and gender mainstreaming in education.

(West, Central and sub-Saharan), South Asia and Latin America and the Caribbean. In Latin America, 22 per cent of girls aged fifteen to nineteen are NEET, as compared to 13 per cent of boys, and the equivalent figures are 33 per cent to 8 per cent in South Asia and 22 per cent to 13 per cent in sub-Saharan Africa (**UNICEF, 2020b**). This results mainly from gender disparity in reproductive labour and household chores, social expectations for girls such as marrying young and having children, and lower aspirations for education and employment for girls. Heterosexism intersects with patriarchal culture and impacts girls’ participation in schooling, because ‘within societies that see girls’ future solely as wives and mothers and doing domestic labor of caring for families, it makes little sense to send girls to formal school’ (**Collins and Bilge, 2016, p. 161**). UNICEF’s statement makes sense in this regard – that quality education guarantees transferable skills for girls (such as critical thinking, communication, and digital skills) for personal and community development while securing access to jobs.

Countries in the Global North have achieved greater degrees of gender equality in educational participation and have now directed attention to the content of education, including gender-inclusive curricula, gender-based violence, teacher training and STEM (science, technology, engineering and mathematics), along with a specific focus on internal differences among populations. In the USA, males are more likely than females to return and achieve a high school diploma or equivalent degree. In a study of urban areas, 42 per cent of males returned to school and graduated, versus only 25 per cent of females (**Dance, 2009, p. 184**). Changes in curricula have been slower, with continuing different levels of gender stereotypes in school books, teaching manuals and in the hidden curriculum. Sweden and Norway stand out in integrating the gender equality goal in the curricula at all levels of education (**Eurydice, 2010**).

Female participation in STEM education continues to be a challenge. Studies have pointed



Female students in science continue to face discrimination, and face androcentrism in the production of knowledge.

out that sexist views still assume that girls and boys have different innate talents, leading to a gendered wage gap in the labour market. Female students in science continue to face discrimination, and face androcentrism in the production of knowledge (Harding, 1996). A historical imbalance of power still exists at both structural and symbolic levels in STEM education (Hussénius, 2020, pp. 573–574). Sexual harassment and harassment on the basis of sex in schools and universities has emerged as a key issue in the global North and Latin America. Studies have shown that cisgender women are at heightened risk of sexual assault compared to cisgender men (Martin et al., 2011; Cantor et al., 2015; Coulter et al., 2017).

Interest in boys' education on these topics has emerged more recently. Education plays a central role in preventing gender violence and sexism when considering the role of boys/men in achieving gender equality (Connell, 2003; Aguayo et al., 2016; Porter, 2016). Men who recognize the feminist movement as a valid movement

for social justice can be powerful allies (hooks, 2000).

Global gender parity in higher education was obtained in 2003 (Carpentier and Unterhalter, 2011, p. 155), but differences remain between countries and levels of study. Women's participation is more limited in sub-Saharan Africa and South-East and West Asia (Ilie and Rose, 2016). Although globally women are more likely to attend higher education, this pattern is reversed in South Asia and sub-Saharan Africa – the women/men enrolment ratio in South Asia is 81/100 and the figure is 64/100 in sub-Saharan Africa (UNESCO Institute of Statistics, 2015). The 2030 SDGs include a specific target on gender equality of access to higher education (UN, 2015).

Beyond the international development agenda, critical approaches have been exploring how education contributes to gender inequality, including feminist, queer and crip (disability) pedagogies, indigenous and decolonial pedagogies, and



Figure 3: Gender development index, 2018

Data divided into five groups: 1 = very high, 2 = high, 3 = moderate, 4 = low, 5 = very low

Source: UNDP (2019, p. 312)



Figure 4: Gender Equality Index 2018:

Data divided into 5 groups: 1 = very high, 2 = high, 3 = moderate, 4 = low, 5 = very low

Source: UNDP (2019)

Although globally women are more likely to attend higher education, this pattern is reversed in South Asia and sub-Saharan Africa.

critical race theory. The reach of these approaches into everyday school practices and curricula remains very limited. Some feminist mobilizations have been demanding not only parity in education, but also a non-sexist and feminist education content that dismantles the androcentric gaze that underlies education and knowledge.

4.3 .4

SEXUALITY: LGBTQ+

The extent of the growing acceptance of sexual and gender diversity is not reflected in educational institutions around the globe (Asquith et al., 2018). While education has been

²The paper uses 'LGBTQ+' inclusive of all sexualities, although some cited secondary sources used other term such as LGBTQI, LGBTI and LGBT. Where these terms are part of an organization name or the title of a cited publication, they remain as original.



Schooling practices are both gendered and sexualized in line with the dominant norms, often covertly.

identified as a core helper, together with more diverse and positive representations of LGBTQ+² (lesbian, gay, bisexual, transgender, queer or questioning) people in the media, its potential has not been fully capitalized (Richardson and Monro, 2012).

High levels of hostility, bullying, exclusion and sexual violence towards LGBTQ+ students persist (UNESCO, 2016), even in countries with inclusive education policies regarding gender and sexuality. Schooling practices are both gendered and sexualized in line with the dominant norms, often covertly, when classes talk about human relationships, family, love, work, sports, science, history and economics (Morgade, 2011; Fields and Payne, 2016, p. 1; Galaz, Troncoso and Morrison, 2016). Schools makes explicit gender and sexuality binaries in the curriculum, pedagogy and school culture, and assume that learners identify as heterosexual and embody heteronormative gender expression and expectations (Francis, 2017, p. 1). In this context, formal sex and relationships education is highly

inappropriate to sexual and gender diverse (SGD) youth, because their experiences are either actively condemned or discriminated, or totally absent (Elia and Eliason, 2010; Abbott, Ellis and Abbott, 2015; Grant and Nash, 2018; Formby and Donovan, 2020). At school, LGBTQ+ youth experience discrimination, segregation, violence, bullying and exclusion. Even low levels of reported homophobia and cissexism in educational settings can produce a climate of fear of actual or potential exclusion and violence (Ellis, 2009). LGBTQ+ students are more likely to experience such violence at school than at home or in the community (UNESCO, 2016).

Bullying and violence based on sexual orientation and gender identity expression (SOGIE) is a widespread global issue (UNESCO, 2016). Due to absence of worldwide international surveys, there is no comprehensive and comparable data on the prevalence of homophobic and transphobic violence in schools, or on how governments address these issues. Only Europe has

In Vietnam, 24 per cent of homosexual students reported experiencing homophobic or transphobic violence because of their gender expression.

conducted a regional survey on homophobic and transphobic violence (**UNESCO, 2016**). There is no global comparative overview of the concrete measures implemented by governments to address the issue.

The first large-scale study in Africa reported that an estimated 18 per cent to 44 per cent of the responders had experienced sexual and gender diversity related violence across Swaziland, Namibia, Lesotho and Botswana (**UNESCO, 2016**). Some countries still maintain explicit anti-LGBTQ+ laws and policies. For example, in Nigeria, homosexual acts remain criminalized and most people disapprove of gay lifestyles (**Okanlawon, 2017**), and the Same-Sex Marriage Prohibition Act has made life conditions much worse for the LGBTQ+ community (**Human Rights Watch, 2016**).

In Asia, homophobic and transphobic violence exists in schools, with the most common form being psychological bullying, especially via cyber-bullying (**UNESCO, 2016**). In Vietnam,

24 per cent of homosexual students reported experiencing homophobic or transphobic violence because of their gender expression. Even though Vietnam has been voting in favour of resolutions seeking to protect against SOGIE based violence and discrimination in recent years, there are still major barriers to the right to education for LGBTQ+ (**Human Rights Watch, 2020**). UNESCO's (**2015**) report on SOGIE in the Asia-Pacific highlights that whole-school programmes are rare and lacking documentation and evaluation. The Philippines is the only country that includes specific reference to SOGIE-based bullying in a national law. Australia and New Zealand have comprehensive guidance on curriculum and resources for teachers, but sexual 'difference' is marginalized and silenced at schools (**Ferfoljia and Hopkins, 2013, p. 311**). In Australia, 61 per cent of LGBTQ+ young people have experienced psychological and 18 per cent physical violence in school and 17 per cent of LGBTQ+ secondary students are



bullied at least weekly in New Zealand (**UNESCO, 2016**).

A study of SOGIE in Europe (**Council of Europe and UNESCO, 2018**) reports higher rates of victimization experienced by LGBTQ+ students than their non-LGBTQ+ peers. The most prevalent form is psychological violence (**UNESCO, 2016**). The International LGBTQ+ Youth and Student Organization (IGLYO), elaborating a European LGBTQ+ Inclusive Education Report (**2018**), indexed how each country meets the minimum standards for inclusive and supportive education for all LGBTQ+ learners, revealing that even those states with anti-discrimination in education legislation with specific reference to sexual orientation and gender rarely consider variations in sex characteristics (intersexuality). For instance, there is no mandatory teacher training on LGBTQ+ awareness in Belgium, France, the Netherlands, Spain or the UK, and there is no systematic data collection on bullying and harassment in Belgium, Malta, Norway, Spain and the UK.

Despite government policies, SOGIE affects 23 per cent of LGBTQ+ students in Belgium and 48 per cent of gay students in Norway, and between 20 per cent and 55 per cent of LGBTQ+ students experienced bullying in the UK (**UNESCO, 2016**).

In Latin America and the Caribbean, the most prevalent forms of homophobic violence are verbal, physical and exclusionary, perpetrated by other students, teachers and staff. At least 40 per cent of homosexual people and 65 per cent of transsexuals in Latin America have experienced homo- and transphobic violence in school (**Red Iberoamericana de Educación LGBTI, 2016**). The same study reveals that 74 per cent of the trans community does not complete secondary school in Argentina; 77 per cent of students stated that sexual diversity was never mentioned in relation to sexual education in Chile; 67 per cent of lesbian and gay students feel insecure due to their sexual orientation in Colombia; and 70 per cent of the gender and sexuality-based discrimination



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cases reported by students were perpetrated by teachers and 30 per cent by students in Bolivia (**Red Iberoamericana de Educación LGBTI, 2016**). Argentina has the most comprehensive policy regarding gender recognition, anti-discrimination law and policies for the LGBTQ+ population, a national law of integral sexual education and policies for school violence that include sexual and gender diversity (**UNESCO, 2015**). In Canada, 55 per cent of transgender students were bullied at least once during their schooling and 70 per cent of students heard homophobic comments daily. In the US, 85 per cent of LGBTQ+ students were verbally harassed in the year prior to the study (**UNESCO, 2016**).

All forms of school violence are a barrier to achieving the SDGs, particularly SDG 4's target of 'safe, non-violent, inclusive and effective learning environments for all'. SOGIE-based violence affects not only self-identified LGBTQ+ students, but also those who are perceived by others as not conforming to gender norms. UNESCO (**2016**) has recommended an integral approach to address SOGIE, which includes the implementation of (1) national policies or action plans, (2) inclusive curricula and learning materials, (3) training for educational staff, (4) support for students and families, (5) partnerships with civil society organizations and (6) monitoring discrimination and evaluating the executed measures.



SOGIE-based violence affects not only self-identified LGBTQ+ students, but also those who are perceived by others as not conforming to gender norms.

BOX 2: FEMINIST TSUNAMI IN CHILEAN SCHOOLS

In 2019, the Chilean feminist anthem ‘Un violador en tu camino’ (‘A rapist in your path’) created by the Chilean feminist collective Las Tesis went global. Las Tesis was then named as one of the most influential people of 2020 by *Time Magazine*. Over the last ten years, young women, feminists and LGBTQ+ students have been problematizing the gender and sexuality-based discrimination and violence that they confront in their institutions and political organizations. ‘Non-sexist education’ became a rallying cry in marches and assemblies. In 2015, the Ministry of Education created a gender unit, which designed

measures to address gender and LGBTQ+ inclusion despite facing fierce resistance from conservative religious sectors of Chilean society. Conservative rights and religious groups were united to oppose what they call ‘gender ideology’ in advancing political agendas ([Troncoso and Stutzin, 2020](#)). In May 2018, the so called ‘feminist tsunami’ unleashed massive protests across the country, and occupied schools and university campuses. In 2018, anti-sexual harassment and non-sexist education protocols and politics were developed, but many demands still need to be addressed.

... children with disabilities, especially in countries of the Global South, are less likely to enter school and have lower school completion rates compared to their peers.

BOX 3: THE UN CONVENTION

Article 24 of the UN Convention on the Rights of Persons with Disabilities (CDRP) ([UN, 2006](#)) stipulates that countries must recognize the right to education for persons with disabilities and take steps to ensure access to an inclusive, quality and

free primary and secondary education on an equal basis with others in the communities in which they live.

4.3 .5

DISABILITY

Disability inclusive education presents a particular lens on inclusion by focusing specifically on the educational opportunities of children with disabilities ([WG3-ch6](#)). According to the UN CRPD ([UN, 2006, p. 4](#)) persons with disabilities include ‘those who have long-term physical, mental, intellectual or sensory

impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others’. As evidenced by the large number of countries that are signatories to the CRPD ([UN, 2016](#)) and those that agreed to the 2030 SDGs ([UN, 2015a](#)), governments around the world are committed to providing quality education services for all. Yet, children with disabilities, especially in countries of the Global South, are less likely to enter school and have lower school completion rates compared



to their peers (UNESCO, 2018a). According to UNESCO (2020, p. 10), children with a disability are ‘2.5 times more likely to have never been in school as their peers without disabilities’.

Inclusive education policies provide insight into the legal basis underpinning the rights of children to education in public schools and help to clarify expectations regarding education access, curriculum accommodations, support and resource availability. Such policies also outline the relevant implementation and accountability mechanisms to help narrow the gap between policy and practice. Even where disability inclusive education policies exist, there are barriers to children with disabilities equally participating in school. Research to date suggests that there are gaps in the implementation and monitoring of policies (Polat, 2011; Malle, Pirttimaa and Saloviita, 2015; Hackett et al., 2016; Poernomo, 2016), sociocultural barriers (Stone-MacDonald, 2012; UNICEF, 2013; Gebrewold et al., 2016),

gaps in teacher preparation and support (Ojok and Wormnaes, 2013; Hettiarachchi and Das, 2014; Myanmar Education Consortium, 2015; UNICEF Viet Nam, 2015; Westbrook and Croft, 2015; Franck and Joshi, 2016; Muega, 2016; Kamenopoulou and Dukpa, 2018) and a lack of resources including affordable assistive tools (Mullick, Deppeler and Sharma, 2012; Bhatnagar and Das, 2014; Hofman and Kilimo, 2014; Okongo et al., 2015) contributing to this challenge. Intersectionality, or the overlap of two or more characteristics such as gender and disability, can compound the divergence in education experiences for children. Recognizing this, agencies such as USAID (United States Agency for International Development) have developed specific guidelines for gender equality and disability inclusion in the education programmes they support, for example in the design and development of teaching and learning materials (RTI International, 2015).

The availability and use of data on the education outcomes of persons with disabilities determines whether the goals of inclusion

Intersectionality, or the overlap of two or more characteristics such as gender and disability, can compound the divergence in education experiences for children.

Education indicators for primary and secondary levels among persons with disabilities are limited, which hinders informed and effective policy-making to close gaps in access and learning.

(‘all means all’) are achieved. Agreement on a valid measure of disability has been difficult to achieve. After decades of effort, in 2006 the Washington Group on Disability Statistics released a short set of six questions based on critical functional domains and activities, with adult respondents indicating the level of difficulty for each (**Washington Group on Disability Statistics, 2020a**). The approach was updated to accommodate the particular needs of children in 2006 and includes questions for primary caregivers about the vision, hearing, mobility, communication, learning, remembering and several other behavioural indicators of the children in their care (**Washington Group on Disability Statistics, 2020b**).

Education indicators, including enrolment rates, learning levels and completion rates for primary and secondary levels among persons with disabilities are limited, which hinders informed and effective policy-making to close gaps in access and learning. In its 2020 Global Education Monitoring Report, UNESCO

(**2020**) also highlight a lack of data to inform inclusive education policies, strategies and practices. In the past five years, over 40 per cent of countries worldwide did not collect some of the most critical data, including on prevalence and school attendance and completion, to inform inclusive education strategies and interventions (**UNESCO, 2020**). The data that are available indicate that persons with disabilities are significantly less likely to complete primary school, and even less so secondary school, compared to their peers without disabilities. Available data from some low- and middle-income countries indicate a 15 percentage-point gap for girls and an 18 percentage-point gap for boys in primary school completion rates of children with and without disabilities (**UNESCO, 2018a**).

4.3 .6

**NEURODIVERSITY
(LEARNING
DIFFERENCES)**



... standardized assessment', is developed in a specific society (Western industrialized countries), which can impact its applicability to other settings.

The concept of neurodiversity focuses on those diverging from what the 'experts' consider neurotypical development in various ways that can impact performance in school. Although the concept of neurodiversity includes many different types of brain variability, it grew from a focus on autism (**Jaarsma and Welin, 2011**) to describing the experiences of other variabilities in learning such as dyslexia (**WG3-ch6**). Dyslexia describes reading disability that impacts the ability to read words accurately and/or fluently. The idea that neurodiversity represents opportunities, as well as difficulties, in achievement is embraced by some (**Shaywitz, 2005; Saltz, 2017**). The concept of 'normative development' in associated skills is often determined by child development-based specialists using standardized assessments of skills to identify skills that render a student as vulnerable in learning. Importantly, 'standardized assessment', is developed in a specific society (the Western industrialized countries), which can impact its applicability to other settings.

The present review focuses particularly on learning differences

in core skills with attention to differences that result in 'learning difficulties' such as dyslexia (problems with word reading), attention deficit hyperactivity disorder (ADHD), dysgraphia (difficulties in word writing) and dyscalculia (specific difficulties with mathematics skills). Rates of these difficulties across countries are difficult to evaluate precisely because definitions of difficulties in learning are very much influenced by societal variability (**Grünke and Cavendish, 2016; McBride, 2019; UNESCO, 2018b**).

Given such variability, the concept of neurodiversity may be considered in relation to a normal distribution (in the statistical sense) of a particular skill. Most learners are relatively average in mathematics or word reading achievement, but some are very skilled, and some are very unskilled. In a basic sense, worldwide, we can consider those with particular difficulties in a given skill-set such as mathematics or word reading to have a disability, with the lowest achievers having the most difficulties (e.g.

Given there are multiple biological and environmental factors interacting in every individual, it is most appropriate to consider a so-called ‘multiple deficits model’ to understand neurodiversity.

bottom 1 per cent or bottom 5 per cent). With this definition, one can conceptualize populations in various countries as roughly all showing equivalent patterns of difficulties and rates of recognized learning difficulties following patterns according to available societal resources. For example, developmental dyslexia affects 3 per cent to 20 per cent of English-speaking children of school age in anglophone countries (**Parrila and Protopapas, 2017**), about 1 per cent in Japan and China and about 33 per cent in Venezuela (**Tarnopol and Tarnopol, 1981**), with these rates likely reflecting the interplay of both language structure as well as how societies perceive dyslexia (**Grigorenko, 2001**).

It is well known that learning differences and other aspects of neurodiversity (e.g. socio-emotional diversity) often overlap. When students are impacted by multiple challenges, this is referred to as comorbidity. For example, there is an overlap of between 25 and 40 per cent between ADHD and dyslexia (**McBride, 2019**), and overlaps in

different learning difficulties are common across cultures (**Moll, Göbel and Snowling, 2014; Landerl and Moll, 2020**). Overlaps in difficulties between mathematics and literacy skills are often relatively broad given that mathematics operations typically make use of some verbal skills (**Moll et al., 2014**). Given there are multiple biological and environmental factors interacting in every individual, it is most appropriate to consider a so-called ‘multiple deficits model’ to understand neurodiversity (**Pennington, 2006; Moll, Snowling and Hulme, 2020**). In a ‘multiple deficits model’, multiple neurological and environmental aspects influence the child’s behavioural and learning outcomes. Examples of neurological risk factors might include difficulties in working memory and phonological sensitivity (**McBride, 2019**), among others. One of the greatest environmental risk factors for learning difficulties is poverty (**UNESCO, 2018b; Winzer and Mazurek, 2015**).

Indeed, recent research highlights differences in neurocognitive



One of the greatest environmental risk factors for learning difficulties is poverty.

development, brain functioning and even brain structure for those from lower socio-economic backgrounds; some of the clearest manifestations of associated disadvantages emerge in the area of learning variability (**Hackman and Kraemer, 2020**). Subtle differences in brain structure, connectivity or volume are sometimes implicated in different areas of diversity such as dyslexia (for a review, see **Tong and McBride-Chang, 2020**), mathematics processing (e.g. **de Smedt, 2020**), autism (**Riddle, Cascio and Woodward, 2017**), attention deficit disorders (**Samea et al., 2019**) and others, but these effects are often small and difficult to pin down. While neuroscience techniques are sometimes useful in predicting variability in learning, these predictions are most effective when combined with additional information. This information might be parental characteristics (i.e. genetics) (e.g. **Gutterm et al., 2010**) or behavioural skills (e.g. **Hoefft et al., 2007**), for example, in understanding reading variability. Multiple risk factors are relatively consistently better than individual variables in explaining

developmental disorders (**Pennington, 2006**).

Although the ‘multiple deficits model’ currently is the best representation of researchers’ understanding of learning difficulties, this model also brings with it some diagnostic ambiguity (**Moll, Snowling and Hulme, 2020**). The fact that difficulties typically represent the bottom of the normal distribution of behaviours means that cut-off criteria that posit a given score on a given test as determining whether the child has a certain disorder is not reliable (**Moll, Snowling and Hulme, 2020**). Across cultures, with different scripts, languages, educational policies and teaching practices all interacting to influence children’s learning (**Daniels and Share, 2018**), a clear definition of dyslexia by society is difficult to establish given local concepts (**McBride, 2019**). While a number of resources highlight basic skills to consider in conceptualizing neurodiversity across cultures, the basic cognitive and linguistic skills contributing to this diversity are universal,

though weighted differently in different contexts (McBride, 2016, 2019; Nag and Snowling, 2012).

There are few systematic reviews of the education of students manifesting various kinds of neurodiversity worldwide. One recent review of policies for children with learning difficulties across ten countries highlighted some important trends (Agrawal et al., 2019), most notably that how these students are assessed, identified and educated varies widely at the international scale, comparing North America, Asia and Europe. Most of these countries were reported to integrate children with learning difficulties into mainstream classrooms for most school hours, with some devoting additional hours for these children to work with learning specialists (e.g. Denmark, Germany, Singapore, Taiwan, UK). Some countries, such as Mexico (UNESCO, 2018b), the Philippines and Zambia (McBride, 2019) simply lack funding to help those with learning difficulties. In other places, regardless of laws or rules, some teachers and school

officials purport not to ‘believe’ in the learning difficulty and, consequently, minimize their support of children with learning disabilities (Nag and Snowling, 2012; Barkley, 2017; McBride, 2019). For example, according to UNESCO (2018b), most countries surveyed have policies that acknowledge that those with special learning needs have the right to an education, but most are also relatively vague on the precise definitions or parameters of these rights or the learning challenges to which they refer.

4.3 .7

CLASS AND INTERSECTIONALITY

Social class refers to a relative social ranking based on assets (wealth), income and associated social capital, power and influence. Although class is often thought of in terms of categories such as wealthy, middle, working, low socio-economic and poor, class is



Educational achievement of children from lower socio-economic backgrounds is relatively poor across grades, a trend that exists globally.

best conceived as being situated along a continuum, specific to a society, that is used for specific purposes (e.g. census) by those in positions of influence. Class confers individual and group identities, and status (a degree of prestige). Class is also about cultures (norms, lifestyles, language use, aspirations, values, tastes and ways of perceiving social worlds) and social networks (relatives, friends, professional), and confers ‘cultural capital’ and ‘social capital’, respectively, to privileged groups (e.g. Bourdieu, 1984).

Educational achievement of children from lower socio-economic backgrounds is relatively poor across grades, a trend that exists globally. Data capturing this challenge for education comes from the Global North, including the US and Canada (Ferguson, Bovaird and Mueller, 2007; Kincheloe and Steinberg, 2007), Japan (Mimizuka and Hamano, 2014) and participants in PISA (OECD, 2010) and in the Global South (Tshabangu, 2018).

Numerous studies have identified the process of how children from lower ranked classes are marginalized. While earlier studies explained poor educational achievement in terms of individual ‘deficit’ (e.g. language skills, ‘school readiness’), the current widely accepted view emphasizes the structural mechanisms whereby mainstream schools operate via the dominant culture (e.g. the language of instruction, the school curriculum, interpersonal interaction patterns, certain worldviews), undervaluing ‘others’ and disadvantaging their children. In some regions there are resource differences at disadvantaged schools, stereotypes and differentiated guidance (based on stereotypes and assumed ‘deficit’).

In developing countries, governments have more vigorously adopted a human capital approach (functionalist approach in sociology) in addressing poverty (WG2-ch3). This approach claims that investment in education leads to higher participation in schooling, national development

When a difference is not valued and is discriminated against, it leads to its holder's marginalization and oppression, culturally, socially and economically in the mainstream society.

and alleviation of poverty, partly influenced by external donor agencies. The approach has not produced the desired outcomes and is now questioned. Studies in sub-Saharan Africa reveal that the measures based on this approach have produced wider educational inequalities, extreme poverty, low participation in schooling and over-reliance on donors (**Tshabangu, 2018**). The approach does not consider and address contextual factors such as conflicts and internal wars in the region that resulted in refugees, limited access to health care, separation from families and child prostitution (**WG2-ch5**). It is estimated that 50 per cent of children in sub-Saharan Africa and 36 per cent in South Asia are living in extreme poverty (**World Bank, 2016**). Consideration of contextual differences at national and local levels is essential to determine how policies can be effectively implemented (Colclough, 2012). Schooling alone is likely to have a limited impact without addressing the political, economic and cultural environments that surround education.

While this chapter has examined forms of diversity independently, it is important to stress that these forms intersect with one another and that this is most conspicuously observed in relation to social class. Intersectionality is the idea that a full understanding of identity and inequality/oppression requires a multi-axis framework (class, race, ethnicity, language, gender, sexuality, disability and other identities). Among working class students, females and males differ in their experience of schooling. When a difference is not valued and is discriminated against, it leads to its holder's marginalization and oppression, culturally, socially and economically in the mainstream society. Individuals with difference subsequently are more likely to face economic hardship or poverty. Individuals carry some form of diversity as an advantage and simultaneously other forms of diversity as a disadvantage, creating multi-layered identities and marginalization. Multiple forms of diversity operate together, not only with social class, but with other forms, in



Women of colour are likely to receive lower wages than their male counterparts and white females, and also face higher levels of sexual abuse or harassment.

mutually reinforcing disadvantage and oppression, and/or in simultaneously conferring advantages and disadvantages on an individual (**Crenshaw, 1991**).

Additional examples of intersectionality abound. Racial minority groups, facing discrimination in the labour market, are more likely to live in poverty, which in turn affects children's school performance and forces them to leave school early. 'White privilege' enables the exploitation of non-white workers. Women of colour are likely to receive lower wages than their male counterparts and white females, and also face higher levels of sexual abuse or harassment. LGBTQ+ people are more likely to live in poverty (**Adams, Hopkins and Shlasko, 2016**) since they are less likely to receive economic, social and emotional support from their families who may reject them, and they also face discrimination in employment. They have limited access to institutional benefits (e.g. tax, dependent allowance) when institutions do not recognize

same-sex marriage.

In the world's poorest countries, class and gender intersect, as seen in the expansion in higher education. Wider gaps in access exist between the rich and poor, and between male and female, benefiting the elite (**Ilie and Rose, 2016, p. 437**). For instance, in Guinea the enrolment rate for poor young women is 0.1 per cent compared to 1.1 per cent for poor young men (**Ilia and Rose, 2016**). To be effective, investment in programmes for girls' education needs to be matched by overall improvements in education systems and investment in other forms of gender equality, as well as in other sectors such as health and the labour market (**Subrahmanian, 2007**). Goals, measures and programmes would benefit from moving beyond the binaries of girls and boys, global and local, education and economic inequities, in order to produce more nuanced and complex interventions (**De Jaeghere, Parkes and Unterhalter, 2013**).



4.4

Teacher Education

Teacher education, through policies and training practices, can prepare teachers to address diversity in support of human flourishing and social justice. We discuss three aspects: recruitment and admission to teacher education programmes; content of teacher education; and appointment. Teachers are critical to ensuring the learning needs of all children – across diversity types – are met, and how teachers inhabit their roles has direct implications for children's learning.

4.4 .1

RECRUITMENT AND ADMISSION

An early point of influence is in the recruitment of teacher candidates and their admission to teacher education programmes, including affirmative action, incentives, indigenous scholarship and career guidance. Entry to pre-service teacher education



Educators can offer culturally competent instruction by establishing important knowledge bases that they can carry into their practice to address diversity.

programmes can facilitate access for students with minority backgrounds, and potentially counter their under-representation in the teaching workforce as well as counter potential barriers to entering graduate study for careers in education.

4.4 .2

PROFESSIONAL KNOWLEDGE BASES FOR DIVERSITY

Educators can offer culturally competent instruction by establishing important knowledge bases that they can carry into their practice to address diversity. One summary of these areas of knowledge is captured in categories that span multicultural education, sociocultural context and the impact on subject-specific learning, interaction styles and learning approaches of students from marginalized cultures, cultural competence

in assessment/teaching practices and materials, types and impact of racism (e.g. structural and institutional), gender and sexual orientation, experiential knowledge, working with students with special needs, and international and global education (Smith, 1998, 2000). Please refer to further discussion of this topic in the chapter addressing teachers (WG2-ch10).

4.4 .3

CONTENT OF TEACHER EDUCATION

The content of teacher education programmes includes curriculum, pedagogical approach and practicum placements. Most teacher education programmes require students to undergo courses on diversity and social justice related issues, covering all the forms of diversity that this chapter addresses, with varying names such as ‘multicultural’, ‘inclusive’ and ‘human rights’

education, as well as ‘diversity and social justice’. Some institutions have made addressing diversity a feature across the whole curriculum, rather than requiring a specific subject as part of the course (Mills, 2013).

The ‘critical approach’ has more recently been used to address diversity and social justice, beside liberal and conservative approaches to teacher education (Freire, 1970 Ellis and Maguire, 2017; Vavrus, 2017). At the core, the critical approach invites students to examine the mechanisms that reproduce social inequality based on diversity. The critical approach’s concrete strategies include an autobiography where students are required to reflect on their own past and consider how their social identities were developed and how others might have different perspectives from such identities (Kramer, 2020). Student teachers then look at how the process of identity perspectives contributes to marginalization and injustices in society and consider ways to challenge the domination of certain groups over marginalized

people (Kramer, 2020). Another strategy is to incorporate critical and culturally responsive teaching in classrooms where different social groups are represented and respected (Thieman, 2016). The critical approach shares many features with an integrated social justice pedagogy model (Enns and Sinacore, 2005). The latter highlights the following dimensions in a learning process that considers knowledge acquisition and experiential learning central to student development: ‘(1) empowerment and social change, (2) knowledge and the knower, (3) oppression and privilege, and (4) self-reflexivity and self-awareness’ (Kassan, Sinacore and Green, 2019).

At the core, the critical approach invites students to examine the mechanisms that reproduce social inequality based on diversity.

One notable concrete initiative is the development of modules for religious teacher training initiated by the European Wergeland Centre (EWC) (Jackson, 2019; Jackson and O’Grady, 2019). This module contains a list of signposts to tackle pedagogical and conceptual issues of religious education and diversity. While the interpretive and religious studies approach is more prevalent



in religious teacher education programmes (**Everington, 2013; Chita, 2018**), some continue with the confessional religious education approach. Even when some teacher education programmes demonstrate the positive sign of incorporating religious diversity issues in the curriculum (**Raihani, 2018**), if deliberate structural concerns with religious diversity are absent, programmes become

more focused on efforts to teach student teachers to become confessional messengers (**Wildan et al., 2019**).

Visibility of diversity type is an issue that has been addressed regarding sexual diversity. It is important not to homogenize LGBTQ+ students, making them less visible in education (**Galaz et al., 2018**). Spade (2011) gives some

... the content, format and duration of teacher education programmes affect the degree to which teachers' attitudes, self-efficacy, behavioural intentions or practices improve.

advice on making education more accessible for trans students and rethinking how we talk about gendered bodies, considering the increasing demands of trans people to access education. Spade invites us to consider certain tips 'for addressing obstacles to trans students' classroom participation and for avoiding unintentional exclusionary practices' (p. 57). He recommends that teachers give students the chance to state what they prefer to be called, and what pronouns they prefer, avoiding making assumptions based on appearances or the class roster.

There are attempts to strengthen teacher training for quality inclusive education in relation to disability, including in the Global South. While some studies find prevailing negative or, at most, moderately positive attitudes towards inclusive education for children with disabilities among teachers or teacher trainees (Emam and Mohamed, 2011; Restuti Maulida, Nandy Atika and Kawai, 2020), there are also interventions positively affecting attitudes, stigma and discrimination (Lautenback and

Heyder, 2019). Teacher self-efficacy in meeting the needs of children with disabilities in their general education classrooms improves inclusive practice (Sharma and Jacobs, 2016; RTI International, 2017); and increases when explicitly trained and supported in adopting inclusive instructional practices and creating welcoming classroom climates (Carew et al., 2018). Yet, the content, format and duration of teacher education programmes affect the degree to which teachers' attitudes, self-efficacy, behavioural intentions or practices improve (Lancaster and Bain, 2018). This association is demonstrated by studies of in-service teacher education intervention programmes designed to improve inclusive education in Kenya (Carew et al., 2018), Colombia (Baldiris Navarro et al., 2016) and Ethiopia (RTI International, 2018).

Teachers working with children with learning difficulties may have had very little or no special training in the nature of learning difficulties (UNESCO, 2018b; Agrawal et al., 2019; McBride, 2019). Their



Teachers working with children with learning difficulties may have had very little or no special training in the nature of learning difficulties.

basic knowledge of the science of reading could be improved (**Berninger and Joshi, 2016; Schiff and Joshi, 2016; Tristani and Bassett-Gunter, 2019; Seidenberg, Borkenhagen and Kearns, 2020**). Some efforts in teacher training from NGOs worldwide can be helpful in this regard (**World Learning, 2019**). Once in a classroom setting, teachers can employ practices to enhance students' learning experiences. Considering disability, the right to reasonable accommodations might include a prioritized seating arrangement (e.g. close to the teacher) when attention is a particular challenge for the student (e.g. **Bulat et al., 2017**), or access to assistive technologies such as text-to-speech devices for those with dyslexia and often more time to complete given assignments when needed. Maximizing resources available for those with learning difficulties is especially important (**UNESCO, 2017**).

At a global level, it is important to note the increasing popularity of the response to intervention (RTI) movement in relation to neurodiversity. Because the

multiple deficits model of learning difficulties represents a confluence of biological and environmental factors and because early intervention tends to be most effective in helping children to overcome a variety of difficulties, researchers have increasingly rejected a strict cut-off definition (**Preston, Wood, and Stecker, 2016**). Such definitions have sometimes been described as 'wait to fail' models in which children are only diagnosed and, thus, given extra help with learning difficulties once they have had difficulties for a sufficiently long time (**Nag and Snowling, 2012; Preston, Wood, and Stecker, 2016**). Instead, teachers are encouraged to observe children periodically and target their particular difficulties in various ways that support their optimal learning (**Nag and Snowling, 2012; Preston, Wood, and Stecker, 2016; McBride, 2019**).

What are some appropriate models for remediation of difficulties in learning worldwide? As a general framework for learning, the Universal Design for Learning (UDL) approach has



been embraced in many settings (**CAST, 2018; King-Sears, 2020**). This method advocates teaching with multiple methods for engagement, representation, and action and expression (**CAST, 2018**). With more specific reference to literacy, researchers (**Nag and Snowling, 2012; Daniels and Share, 2017; McBride, 2019; Seidenberg, Cooper Borkenhagen**

and Kearns, 2020) have identified skills related to sound, meaning and print that apply at different levels across scripts and languages. Teachers should conceptualize children's literacy learning as language by ear, by eye, by hand and by mouth for maximum efficacy (**Berninger and Joshi, 2016**).



Criticisms in Australia point to teacher placement practices that provide limited experiences for student teachers to develop a more complex conception of diversity and social justice.

4.4 .4

TEACHER EMPLOYMENT

A limitation preceding employment, but related to it, is the teacher placement opportunities available. Criticisms in Australia point to teacher placement practices that provide limited experiences for student teachers to develop a more complex conception of diversity and social justice. The dominance of the Anglo-white background of the pre-service teacher body limits the exposure of the students to the diversity they will face in future workplaces (Reid and Sriprakash, 2012; Mills, 2013).

To secure a teaching position, the pipeline following teacher

education programmes varies. Some communities include external examinations. In Japan, local education boards provide assessments to those who have completed the requirement for a teaching certificate and appoint successful candidates to local schools under its jurisdiction. In Australia, candidates who complete a Bachelor of Education, or an undergraduate degree/Master of Teaching, register with the relevant state department of education and individually apply to respective schools. The extent to which diversity/social justice training is addressed in these assessments will impact on the content of teacher education programmes. To fill teacher slots in selected communities, incentive programmes have been established to bring teachers to, for example, rural areas, as seen earlier in Indonesia's remote Indigenous schools.



4.5

How have these responses to diversity addressed (facilitated and hindered) students' human flourishing and social justice? What are the implications for policies and practice?



We have examined selected forms of diversity, namely, race/ethnicity/language/tribes, religion, gender, sexuality, disability and neurodiversity, and the intersectionality of these diversities. Below we outline key findings and implications for stakeholders, parents, teachers and learners, schools of education and academia, funders, and policy- and decision-makers and ministries of education.

4.5 .1

KEY FINDINGS

- Diversity categories are socially constructed and remain political, fluid and contentious, and affect the identities that students develop. Different forms of diversity intersect in affecting students' school experience. Class intersects all forms, leaving minority groups in the lower socio-economic strata of society. The extent of diversity and marginalization varies across localities, and these variations

also impact how individuals of different forms of diversity experience schooling.

- Student learning occurs under the structural and external constraints of the political, institutional, social and cultural environment that students inhabit. Individuals possess capabilities and the space to exercise agency in pursuing what they desire, under these constraints. This is demonstrated by active civil movements, as well as students' and teachers' interpretation and pushback of the boundaries.

- Policies to address diversity and social justice exist at the national, local or school levels, often under the headings of 'multicultural education', 'inclusive education', 'human rights education' and 'diversity and social justice education'. These policies are tightly coupled with political, social and economic contexts. Most governments officially advocate for the goal of 'equal educational opportunities' via

Insights from cognitive neuroscience indicate the universal features learners share despite diversity, as well as group differences among subgroups that are characterized by distinct neural signatures (e.g. for dyslexia).

constitutions and legislation; but beyond that variously prioritize different forms of diversity (race/ethnicity/language/tribes, religion, gender, sexuality, class, disability and neurodiversity), guided by political, social and economic contexts. Sexuality and neurodiversity (learning differences) are relatively new additions to the diversity discussion in some countries.

- Approaches to address diversity have shifted from assimilation to celebrating differences, and then to a critical approach whereby all students understand their own unconscious bias and mechanisms of oppression in schooling. These changes derive at least partially from equity demands from minority groups and their advocates in the form of civil activism, which confirms that individuals possess ‘capabilities’ and agency to pursue what they desire. In many contexts, policies increasingly address the intersectionality of different forms of diversity and inequality, such as socio-economic class and race/ethnicity/religion.

- Educational measures to address diversity include: (1) group-targeted programmes (affirmative action, special courses, provision of resources); and (2) culturally responsive learning approaches. Recently, there has been increasing interest in (2) in addition to continued investment in group-targeted programmes.

- The extent and nature of policy implementation vary across societies, due to the political, economic and cultural environment of localities, the level of monitoring, funding levels and the extent of relative autonomy space for agency, which allows varying interpretations by local practitioners and teachers.

- Insights from cognitive neuroscience indicate the universal features learners share despite diversity, as well as group differences among subgroups that are characterized by distinct neural signatures (e.g. for dyslexia). Such findings offer an understanding of difference based on brain differences for learners and bring a shared vision



of universal learning features that transcend other diversity forms such as race/ethnicity, religion, gender and sexuality.

- *The crucial role of teachers is widely acknowledged. A more recent approach to teacher education is called the 'critical approach'*, which urges education students to reflect on their own experiences and understand systemic mechanisms of marginalization, and also prepares trainee teachers for inclusive education by addressing all forms of diversity students bring to school.

- *In formulating and implementing policies to address diversity and social justice*, it is crucial to consider locally specific political, economic and social contexts of diversity, and to involve practitioners on the ground.

- *Communities and institutions advocate the general goal of equal opportunity and human rights but may not have developed concrete policies and measures to counter the disadvantages that children of diverse backgrounds experience at school*, and to advance the learning of all students by capitalizing on learner diversity. This can result in a limited impact in support of human flourishing and social justice. Measures can target one specific form of diversity or address various forms of diversity in combination. The former enables more focused measures for a specific diversity, while the latter has the potential to address the intersections of multi-forms of diversity simultaneously.

The implications of these findings extend to parents, teachers and learners, schools of education and academia, funders (private sector, foundations, departments of education), policy- and decision-makers, and ministries of education.

4.5 .2

IMPLICATIONS

The implications of these findings extend to parents, teachers and learners, schools of education and academia, funders (private sector, foundations, departments of education), policy- and decision-makers, and ministries of education.

Systematic and regular appraisal of policy and measure implementation is likely to increase effectiveness and impact.

- ***Policy-makers and educational practitioners are challenged with striking a balance between group-specific targeted programmes*** (e.g. learning assistance for migrants) and those for all students (e.g. social justice education across the curriculum). It is important to consider specific local contexts since there is not one form that will fit all.

- ***Systematic and regular appraisal of policy and measure implementation is likely to increase effectiveness and impact.*** Such efforts can enhance understanding of parity differences, for example, across diversity subgroups. However, there is a dilemma in trying to collect data about group-specific academic achievement, while seeking to minimize the potential for such data to stigmatize the group. Some countries have not collected such data.

- ***Teacher education is critical for equipping future teachers to manage diversity and social justice in classrooms.*** The skills required for teachers go

beyond addressing peer group discrimination, harassment and bullying, and include offering culturally responsive learning and nurturing critical and self-reflexive understanding of diversity among all students. This can be achieved either by requiring students to undertake specific subjects on diversity and social justice (in the name of multicultural or inclusive or human rights education), by including diversity and social justice across the whole teacher education curriculum, or both. Individual teacher education institutions are best equipped to develop their own approach and content, to best suit the local environment. The effectiveness of such programmes will be enhanced by diversity amongst teacher educators.

- ***The right to an inclusive education is one value that is widely shared*** (e.g. Arduin, 2015; Hayes and Bulat, 2017). Those with differences in learning can benefit greatly from access to additional support, individualized education plans, and teachers who have some knowledge and understanding of



Diversity is a concept that permeates educational settings cross-nationally and is often complicated by intersectionality among diversity types and with inequality and oppression, which hinders full human flourishing and social justice.

neurodiversity; as well as through receiving respect as a whole person (e.g. Hayes and Bulat, 2017). Respect for the whole person involves understanding an individual in their totality, including emotions, social goals and ways of learning, as well as identities based on diversity. Such understanding contributes to a more harmonious classroom environment and helps students to pinpoint their strengths and weaknesses. Since a student may be weak in some of these skills and strong in others, grading an assignment based only on a single criterion can particularly isolate and discourage a child with a learning difficulty (McBride, 2019). The implications of literacy policies are that there are both universal and specific aspects of learning to read and to write. It is possible to have difficulties in reading in one script but not in another, but there are also clear overlaps in reading across languages and scripts (McBride, 2019). Teachers can consider the

requirements of the script as they plan how best to teach students in each language and script (Daniels and Share, 2017).

This chapter has assessed education's response to diversities, interconnected inequality and their intersectionality, and how these responses relate to human flourishing and social justice. Diversity is a concept that permeates educational settings cross-nationally and is often complicated by intersectionality among diversity types and with inequality and oppression, which hinders full human flourishing and social justice. However, there are ways for education to respond to diversity through policies and practices, as well as teacher preparation programmes to address diversity, which provide an opportunity to acknowledge human difference while capturing the overall universality of human experience.

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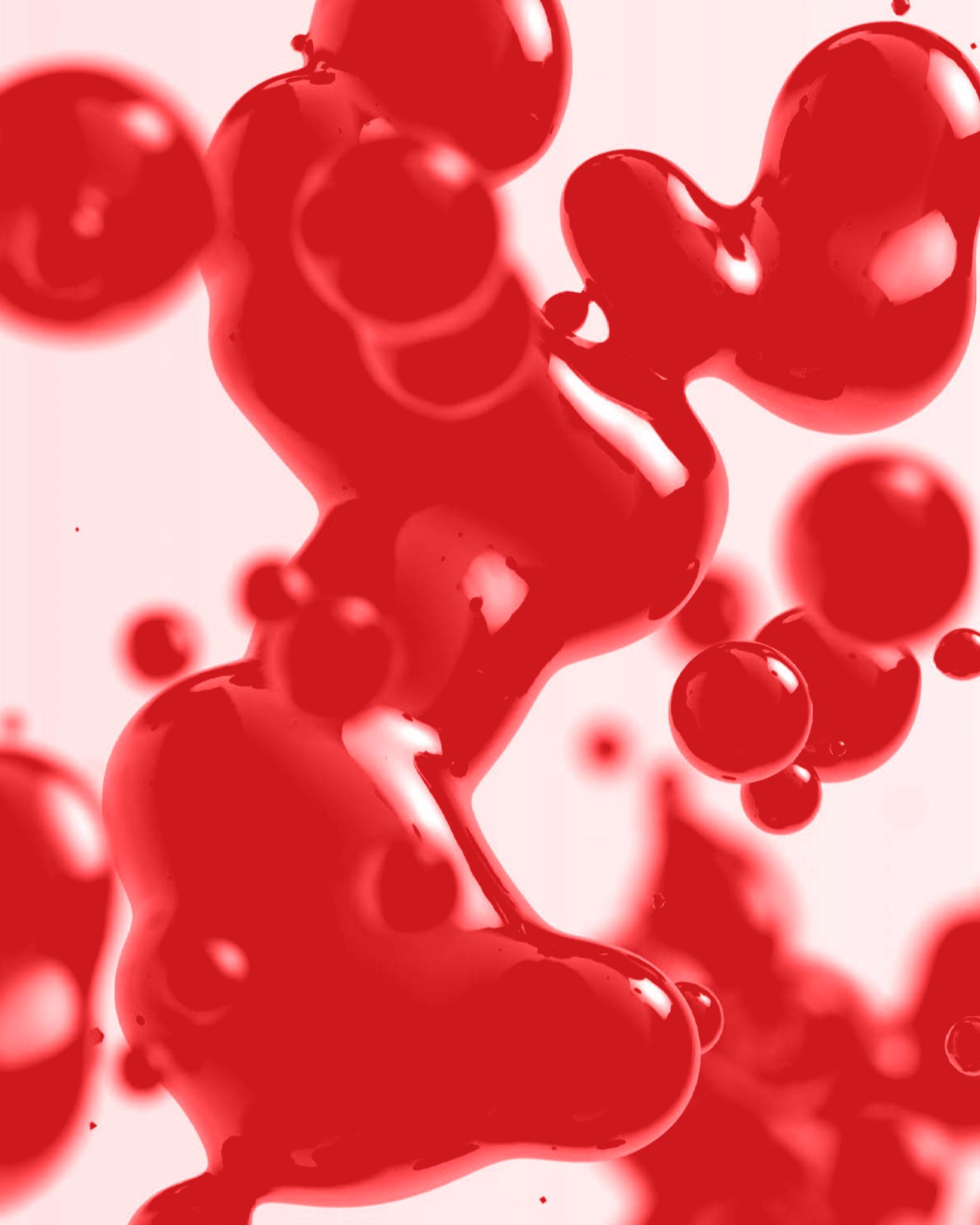
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C H A P T E R

5

From perpetrator to peacebuilder: rethinking education in conflict- affected societies

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This chapter explores the nexus between education and conflict, positioning education as a contested domain that shapes, and is shaped by, a broad range of social, political, economic and cultural dynamics in conflict-affected societies. On the one hand, violent conflicts and structural violence have detrimental effects on educational processes and outcomes. On the other hand, education itself can (re)produce structural violence in society. Bringing together the fields of social science and cognitive neuroscience, this chapter provides a multi-faceted lens through which to address the challenges of education in different conflict contexts from around the world, highlighting that the search for a collective peaceful future is complex.

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5.1

Introduction

There is more than one way to tell a story. On the tumultuous path humanity has forged through history, it is easy to forget that it is often those in power who tell the story – the ‘truth’ – while myriad alternative accounts are buried or suppressed. With increasing political polarization, global refugee crises and violent conflicts over dwindling natural resources, this raises questions of how we understand our history, how we understand ourselves in relation to the society in which we live, and how we understand each other. At the heart of these questions is the role of education, and how we learn to handle differences, disagreements and controversies about our social and cultural values, political interests and distribution of resources. With strong neoliberal forces pervading all facets of life, education can

be a perpetrator, producing or reproducing structural violence in society. Up against such forces, education can also be a liberator, promoting critical thinking, reflection and critical consciousness in the face of such structural inequalities. Education can also be a victim, facing violent attacks for the contesting ideology it promotes as well as a tactical target during the war. Finally, education can be a peacebuilder, providing relevant knowledge and skills for employment and stability in people’s lives, representing bottom-up, participatory forms of learning about how to deal with differences in a non-adversarial manner and to redress educational policies and practice that fuel conflict. These perspectives provide the multifaceted lens that we loosely call the victim–perpetrator–liberator–peacebuilder



(VPLP) framework, and through which this chapter will address the challenges of education in different conflict contexts around the world, highlighting the nuances in our search for a collective, peaceful future.

Violent conflicts and structural violence have detrimental effects on educational processes and outcomes. In contexts that are directly affected by physical violence, educational processes are disrupted and discontinued, whereas education systems that are characterized by structural inequalities maintain unequal access, thus reproducing unequal outcomes for different social groups. In this chapter, we broadly conceptualize ‘conflict’ in education in physical, cultural and structural forms – from disruption of learning and experience of violence to exclusionary policies, intergroup threat perceptions and animosity, inequitable access to educational resources, and educational practices that involve cultural repression, misrecognition and stereotyping of socially disadvantaged groups. Education

may also be used to defend ‘societal security’, the ability of a society to reproduce its essential features, and portray certain cultural groups as an ‘existential threat’ (Buzan, 1991; Buzan, Wæver and de Wilde, 1998). Teaching and learning processes may stereotype and demonize the ‘other’ through curricula and pedagogies, which fuels intergroup antagonism and threatens societal security. In order to provide safe environments for human development and prosperity, it is crucial to examine how learning environments are disrupted by conflict and subverted by structural violence, and what types of social, physiological and psychological effects are endured by learners in these communities, as well as the kinds of interventions that can mitigate the impacts of such obstructions.

Conceptualizing education as a societal process that shapes human behaviour and social action, this chapter provides a critical analysis of education from a conflict perspective by drawing upon theories and concepts from

Teaching and learning processes may stereotype and demonize the ‘other’ through curricula and pedagogies, which fuels intergroup antagonism and threatens societal security.

We contend that solutions to current inadequacies in education are best addressed by the promotion of diversity with equity, not only in access to and outcomes in education, but also in the ways educational systems exacerbate or ameliorate existing forms of conflict-promoting conditions in global societies.

the social, neural and cognitive sciences.

In **section 2**, we begin with an overview of conflict and the global learning crisis, created by violent conflicts and mass displacement, and the multitude of ways in which populations, and particularly learners, have been affected by physical, cultural and structural violence. We develop our analysis using a framework for multidirectional interactions between education and conflict in which education is viewed simultaneously as a victim, perpetrator, liberator and peacebuilder (**Pherali, 2016**).

In **section 3**, the analysis moves on to the specific biological and behavioural responses to conflict by considering a broad range of factors that impact on learning, such as inter-generational dynamics, experiences of relationships, concerns about disenfranchisement and inequalities as well as individual differences in cognitive abilities related to learning.

In **section 4**, our attention moves to the notion of diversity with a focus on equity, engaging with concepts of cultural, ethnic, religious and social diversity, and we argue that ignorance of social and cultural diversity can be detrimental to peace (see **WG2-ch4**) for more on diversity and social justice. We contend that solutions to current inadequacies in education are best addressed by the promotion of diversity with equity, not only in access to and outcomes in education, but also in the ways educational systems exacerbate or ameliorate existing forms of conflict-promoting conditions in global societies.

In **section 5**, we present an innovative framework for education in conflict settings which highlights the need to approach education policies with knowledge from diverse fields of social science and neuroscience. We argue that this would encourage policy-makers to consider education beyond the technical process involving school enrolment, teacher recruitment, training and redeployment, assessment and financing, and

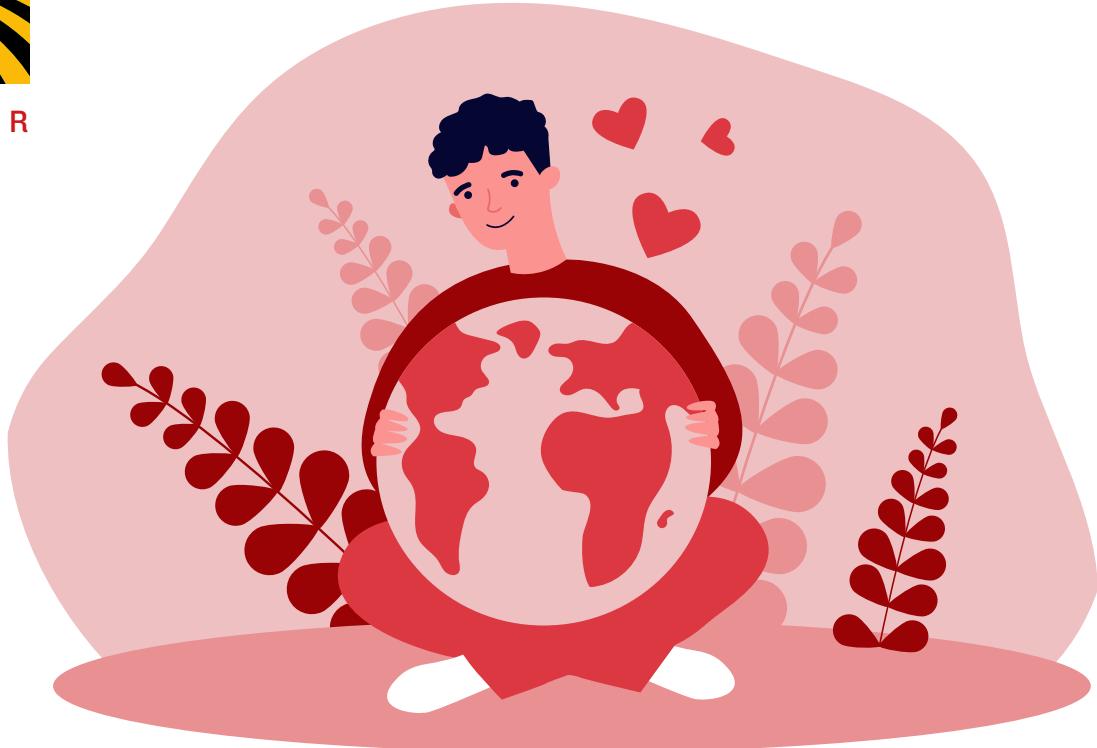


... the dominant argument about education in relation to economic development, which, though important, is insufficient to explain or find educational solutions to social instabilities.

move towards education as an emergent and contested process. Essentially, we claim that, from a conflict perspective, education is fundamentally a political process, whose power dynamics must be considered beyond its role in economic development and, at the micro level, that the social, political and economic conditions of a society have neural effects on learners. Finally, noting that education should nurture civic identities, diversity and social justice, we discuss educational implications for various stakeholders in conflict-affected contexts.

Before moving on, it is important to note the interdisciplinary nature of this chapter, and how we have gathered evidence for our arguments. The lead authors have come together from different academic fields in the natural and social sciences to work towards providing a framework for the integration and synthesis of neural and social science perspectives to better understand the causes and consequences of conflict on learning and well-being. The arguments are based on our critical

analysis of evidence in selected bodies of literature, combined with the authors' years of research in the fields of education, conflict and international development, neuroscience, history education, and peace and conflict. Our analysis is informed by critical scholarship that goes beyond the dominant argument about education in relation to economic development, which, though important, is insufficient to explain or find educational solutions to social instabilities. Hence, we focus on contentions around history education, identity politics and social justice, and encourage engagement with a grassroots/civic approach to education, rather than top-down 'expert' opinions on how education is understood and how educational programmes are designed. Recognizing that all research is to some extent subjective, and methods are inherently 'messy' (Law, 2004), we contend that our respective expertise or 'subjectivity' is offset by our interdisciplinary approach, and the clustered educational framework we put forward.



5.2

Theorizing the inter-relationships between education, conflict and peace

Many earlier works on social conflict point out that the deprivation of underlying individual human needs and values is at the root of protracted social conflicts (Burton, 1987,

1990; Azar, 1990). Building upon these ideas, further studies have highlighted the importance of social identities in the dynamics of conflict (e.g. Ashmore, Jussim and Wilder, 2001; Korostelina, 2007;



McKeown, Haji and Ferguson, 2016; Langer and Kuppens, 2019). In identity based conflicts, rebel groups tend to share common identities (e.g. social class, cultural/linguistic community, religion, ethnicity or caste), exhibit a profound sense of loyalty to their group and hold a deep belief in their common fate, interests and experiences of deprivation and stress. Mobilized by their leaders, groups adopt communal goals of changing existing social situations and confronting outgroups in the struggle for power and resources (Kriesberg, 2003).

Within the educational domain there is a continuum of power from suppressed minorities to identity conflicts between relatively equal communities, whereby competing groups' notions of peace and conflict acquire different meanings as they are viewed from different perspectives leading to a plurality of understanding (Leonardsson and Rudd, 2015; Zembylas, Charalambous and Charalambous, 2016). Disadvantaged identity groups are likely to be under-

represented, or they might feel that curricula, language of instruction and educational policies in general repress their cultural or religious identities. This process can result in rejection of education or noticeably low educational attainment among children of deprived identity groups. In situations where there is competition for power or resources, group leaders use communal stereotypes, beliefs and narratives, as well as ingroup loyalties, to mobilize their followers (Johnson, Terry and Louis, 2005; Louis et al., 2007). These adopted identities are connected to economic and political interests, and reinforce the negative perceptions of outgroup members. In this process, formal education often plays an influential role by reproducing these divisive narratives and hegemonic ideologies through policies concerned with educational access, assessment mechanisms and the curricular framework. The Bantu Education Act of 1953, for example, legitimized racially separated educational provisions in South Africa, and the divided

... the deprivation of underlying individual human needs and values is at the root of protracted social conflicts.

... education systems that underpin unequal power relationships between diverse social groups and promote exclusive cultural, historical and political worldviews through education policies, curricula and pedagogical practices can implicitly perpetrate structural and categorical violence.

schooling between Catholics and Protestants in Northern Ireland has created barriers to children from different religious groups to come together for collective learning and social experiences (Gallagher, 2004). In any society, education systems represent the values, cultures and philosophies of the dominant social groups and hence, educational processes tend to operate within a complex political economy that ensures unequal distribution of power and resources across different social or cultural groups.

Identity-based conflicts therefore lead to categorical violence, which develops into direct, cultural and structural violence (Galtung, 1969). While direct violence describes open cases of aggression, structural violence is understood as injustice and exploitation built into a social system of inequalities, and cultural violence is based on prevailing attitudes and beliefs that discriminate against certain groups in society. In this sense, education systems that underpin unequal power relationships between diverse social groups

and promote exclusive cultural, historical and political worldviews through education policies, curricula and pedagogical practices can implicitly perpetrate structural and categorical violence. Before we turn to the VPLP framework, which provides different lenses through which to explore these power relationships, we note that we are mindful that these four strands of interaction are by no means exhaustive or exist in isolation. We would also argue that a quality education should always serve freedom, dignity and peaceful coexistence, and that liberation does not mean reversal of unequal power relationships, but instead lays the foundations for progress towards equity, mutual respect and recognition of all forms of diversity. Hence, the concepts we draw on to develop our analysis in this chapter provide a lens rather than a theoretical explanation for the education–conflict–peace nexus, and often overlap, evolve and expand depending on the context and nature of the conflict, complex political dynamics and educational programming. Nevertheless, we



treat the framework as a broadly accommodative tool that enables practitioners, researchers and policy-makers to understand the politics of education in conflict-affected and fragile settings.

5.2 .1

EDUCATION AS VICTIM

Education is a major victim of violent conflicts that occur around the world ([UNESCO, 2011](#); [Save the Children, 2013](#)). One of the reasons for attacks on education is that education represents the authority of the state, and schools are one of the few institutions that are widely spread across state territories, thus representing the state's economic, social and political visions. Where rebel groups do not have the military strength to directly face state security forces, they are more likely to attack soft targets such as educational institutions, teachers and school children that will serve their propaganda ([GCPEA, 2018](#)). Schools are also targeted violently because of rebel groups'

rejection of the type of education that is on offer. National education policies, curricula and pedagogical practices may also be perceived as assimilative, repressive and offensively ideological to the culturally diverse communities. For example, the Maoist insurgents in Nepal attacked schools that taught Sanskrit as a subject and burnt Sanskrit textbooks during the rebellion (1996-2006) to challenge oppressive caste-based structures that aspects of Sanskrit education legitimize ([Pherali, 2011](#)). In Afghanistan, schools are attacked by the Taliban and ISIS for promoting Western-style education and educating girls ([Burde, 2014](#)). Attacks on education cause deep levels of psychological stress in populations; rebel groups benefit from it by creating political pressure on the state as well as by affirming their control over local communities. A particularly poignant case is that of the attacks on 'Western education' by the militant group Boko Haram in Nigeria, which demonstrates the fragile, soft target of education as victim ([see text box 1](#)).

National education policies, curricula and pedagogical practices may also be perceived as assimilative, repressive and offensively ideological to the culturally diverse communities.

BOX 1: EDUCATION AS VICTIM: BOKO HARAM IN NIGERIA

Notably, it is not only the rebel groups that disrupt school routines, but also government forces who occupy school premises for military purposes

Boko Haram is a militant group in Nigeria which targets schools for teaching English, mathematics and science, and for enrolling girls. Literally meaning ‘Western education is forbidden’, Boko Haram’s hostile ideology towards secular education has gained notoriety for its repeated attacks on primary and secondary schools (and teachers, administrators and students) (**GCPEA, 2018**) that promote liberal ideas, education for employable skills and international dimensions (**Afzal, 2020**). Particularly gruesome attacks took place in 2014 and 2018 in Chibok and Dapchi towns where about 279 and 110 schoolgirls respectively were kidnapped by Boko Haram. This news made international headlines, and many of the girls remain in captivity. Today, the region’s educational activities are grossly disrupted; UNICEF (**2019**) reports that around 802 schools remain closed, 497 classrooms have been destroyed and about 1,392 classrooms

have been damaged. This has resulted in about 2.8 million children needing education-in-emergencies support in the conflict-affected states of Borno, Yobe and Adamawa. The situation has also placed Nigeria on top of the list of countries with a high number of children out of school. Notably, it is not only the rebel groups that disrupt school routines, but also government forces who occupy school premises for military purposes (**UNESCO, 2011**). Additionally, government forces that are deployed to protect schools from militant attacks put schools at risk of being caught in the crossfire between the warring parties (**Watchlist, 2005; Burde, 2014; Brooks and Sungtong, 2016**). The potential risk of violence in the school environment results in long-term psychological vulnerability of teachers and students. Victimization of education also occurs through denial of girls’ access to schools. Erulkar and Bello (**2007**) point out that girls



Violent conflicts often cause mass displacement of vulnerable populations, which has debilitating impacts on the educational life of children.

in northern Nigeria have low levels of education and tend to marry at an early age. Moreover, since the Boko Haram

kidnapping in 2014 and 2018, enrollment of girls has been declining (**GCPEA, 2018**).

Violent conflicts often cause mass displacement of vulnerable populations, which has debilitating impacts on the educational life of children. At the end of 2019, violent conflicts and natural disasters caused the forced displacement of 79.5 million people worldwide, 24 million of whom have been living as refugees (**UNHCR, 2020**). The Internal Displacement Monitoring Centre reports that around 55 million people are internally displaced, and a vast majority of these live in dire living conditions, which have been further worsened by the COVID-19 pandemic (**IDMC, 2021**). For example, the protracted war in Syria has led to internal displacement of around 6.6 million people who have been forced to flee multiple times as the front lines of war constantly shift and basic

services, such as water, shelter and food supplies, breakdown (**IDMC, 2021**). Educational access for learners in these contexts is limited and when it is available, it usually lacks conflict sensitivity and appreciation of the socio-political environment of the host community, fuelling social tensions between the internally displaced persons (IDPs) and their host communities (**Shanks, 2019**).

Around half of the refugee population is under the age of eighteen and less than half of these have access to education. It is estimated that 37 per cent of primary-aged refugee children are out of school and a mere 24 per cent have access to secondary education. Access to higher education is a dismal 3 per cent among refugee populations. Refugee youth face the risk of

At the end of 2014, the average length of exile reached twenty-five years in thirty-three protracted refugee situations – nearly three times as long as in the early 1990s.

being recruited into armed groups, or forced into child labour and sexual exploitation, and miss out on the opportunity to gain knowledge and skills to live productive and independent lives. Worryingly, the refugee crisis caused by violent conflicts or climate emergencies is becoming increasingly protracted (**Anselme and Hands, 2010**). At the end of 2014, the average length of exile reached twenty-five years in thirty-three protracted refugee situations – nearly three times as long as in the early 1990s (**UNGA, 2018**), creating prolonged vulnerability and marginalization for both IDPs and their host communities (**IDMC, 2015**). Given the protracted nature of displacement, a refugee child's entire period of school and tertiary education can be spent in exile, resulting in increasing demands for secondary and higher education in refugee settings.

As identity-based conflicts permeate the fabric of social life in a vast number of societies, education becomes deeply embedded in the complex relations of identity and power

in existing intergroup conflicts. Given that conflicts are also bound up with issues of coercion and legitimacy, education becomes entangled in power struggles between conflicting groups. As demonstrated in the example of attacks on and rejection of education in northern Nigeria, it is not necessarily the idea of 'learning' that is being resisted. Rather, it is the type of education with certain values and visions that is being rejected by dissident groups such as Boko Haram.

5.2 .2

EDUCATION AS PERPETRATOR

The last decade has seen a growing body of literature that examines the contested role of education in the production and exacerbation of violence (**McLean Hilker, 2011; Burde, 2014; King, 2014; Pherali and Sahar, 2018; Davies, 2019**). Formal education that lacks conflict sensitivity may be



History curricula and textbooks that provide dominant narratives about the past shape social, cultural and political struggles in contemporary societies.

socially destructive when it: fails to address problems around unequal access to and quality of education; maintains a segregated and unjust educational provision; promotes biased history through curricula and textbooks; and maintains exclusionary educational practices in which ethnic, cultural and religious minorities are deprived of their right to learn in their mother tongue (**Bush and Saltarelli, 2000**). In particular, the policy on language of instruction is a significant though complex issue: on the one hand, instruction in the mother tongue during primary years can achieve far better results than that in a non-native language (**Bühmann and Trudell, 2007**). On the other hand, offering education exclusively in the mother tongue and not allowing education in languages that create wider political and economic opportunities can also be problematic (e.g. apartheid in South Africa (**Baker, 2011**) (see also **WG2-ch8** and **WG3-ch5**)). The imposition of the dominant language on multilingually diverse ethnic and indigenous communities through formal

education can be a repressive force and can destroy a group's resource base, thereby eroding culture, traditions and identity (**Pherali, 2016**). State-controlled education systems tend to privilege the historical knowledge and cultural values of the ruling political class via formalized curricula, pedagogical practices and assessment mechanisms. In this process, social groups with less power are obscured in what is considered legitimate and accredited knowledge in formal education systems.

History textbooks often contain narratives of self-glorification and demonization of the national 'enemy' which produce and harden nationalist ideologies. History curricula and textbooks that provide dominant narratives about the past shape social, cultural and political struggles in contemporary societies (**Symcox, 2002; Evans, 2010; Carretero, Berger and Grever, 2017; Davies et al., 2018; Hartman, 2019**). These tensions include contentions around teaching of the history of mass violence in the Second World



War in Russia and Estonia (**Borger, 2020**), the Holocaust in Poland (**Santora, 2019**), political prisoners in Chile (**Keough, 2020**), the occupation of Korea, forced labour and comfort women in Japan (**Nozaki, Vickers and Jones, 2005; Korostelina, 2008**) and territorial expansion controversies around the Nanking massacre during the Japanese occupation of China during the Second World War (**Vickers and Jones, 2005**). Rather than confront these tensions, schools and educational authorities frequently either opt out altogether from the teaching

of controversial issues due to emotional, political or national security concerns, or engage in teaching biased historical narratives to serve nationalist interests. Unfortunately, many teachers appear to eschew complicated discussions in classrooms due to discomfort or the belief that teaching about history is irrelevant in the face of ongoing violence and problems in the country (**Zembylas, 2014; Zembylas, Charalambous and Charalambous, 2014; Zembylas et al., 2018; Benwell, 2021**).



... schools and educational authorities frequently either opt out altogether from the teaching of controversial issues due to emotional, political or national security concerns, or engage in teaching biased historical narratives to serve nationalist interests.

There are widespread examples from around the world where formal education has been complicit in fuelling grievances among marginalized groups. The dominance of hill high castes and their native language on ethnic minorities in Nepal (**Pherali, 2011**), depictions of Tamils as the historical ‘other’ in Singhalese textbooks (**Nissanka, 2016**) and misrepresentation of the Second World War atrocities performed by Japanese troops in China and Korea (**Ku, 2016**) all exemplify how education can become a problem from a conflict perspective. In Rwanda, post-independence educational policies and the ethnicity-based quota system denied many Tutsi children access to education (**McLean Hilker, 2011**). Even though educational exclusion was not the primary cause of the genocide, it was an integral part of the wider structural violence perpetrated on Tutsis. King (2014) notes that pre-genocide education played a complicit role in cultivating the beliefs that Tutsis had collaborated with colonizers to marginalize and oppress the majority Hutus.

Consequently, education became a part of the synergetic interactions between the psychocultural factors of ‘categorization’ (exclusive identification of individuals being a member of a particular group), ‘collectivization’ (a process of essentialization that considers everyone in the group as being the same) and ‘stigmatization’ (attributing disapproval and scapegoating), which led to rationalization of the proximate causes of genocide (King, 2014). Similarly, an analysis of multination civic textbooks reveals that in Cyprus, Argentina, post-genocide Rwanda, China, South Africa and Mozambique, textbooks promote a discourse of cultural assimilation rather than celebrate diversity, while strong elements of ethnic nationalism and prejudices are found in textbooks from Bosnia-Herzegovina, North Korea, China, Romania, Serbia, Croatia and Ukraine (Quaynor, 2012).

Box 2 provides an example of education as perpetrator in the continued conflict between Russia and Ukraine.

... education maintains socio-economic divisions and fuels political tensions that often lead to violent conflict.

BOX 2: EDUCATION AS PERPETRATOR: TEACHING HISTORY IN UKRAINE AND RUSSIA

History education is a significant factor in the conflict between Russia and Ukraine, in which competing historical narratives speak to dynamics at the level of international relations as well as those at the level of national educational policies and practices. The governments of the Russian Federation and Ukraine use state-controlled history education to define their national identity and to posit themselves in relation to each other. Thus, history education in Ukraine positions Russia as an oppressive and aggressive enemy and emphasizes the idea of victimhood as at the core of national identity.

History education in the Russian Federation condemns Ukrainian nationalism and proclaims commonality and unity of history and culture with Russian dominance over ‘younger brother, Ukraine’ (*Korostelina, 2010*). In Ukraine, history teachers in different regions support competing narratives, reproducing conflict in their classrooms by altering the teaching programme and textbook narratives and promoting their vision of a nation, the rights of their groups to participate in the nation-building process and defining enemies and allies within and between the nation. History teachers’ social identity affects how they present the ingroup and other groups to school pupils and how they

use textbooks in their teaching (*Korostelina, 2015*).

Education plays an implicit but central role in reproducing these deeply rooted hierarchical



and manipulative structures through the elite policy-making process, justification of patterns of exclusion and inclusion, social boundaries, labelling and stereotyping of biased histories in curricula and teaching, and repression of cultural and social values of minorities and enemy groups both at national and global levels (Davies, 2010). In doing so, education maintains socio-economic divisions and fuels political tensions that often lead to violent conflict. This understanding has important implications for education policies and programming in general, but more specifically, in conflict-affected environments where educational reforms need to be understood beyond the framework of service delivery. Uncritical, technocratic and apolitical education inculcates submission to the economic and political interests of the corporate sector and disconnects learners from the process of critical reflection and the basic principles of humanity such as love, compassion, mutuality and social justice.

... education can help preserve the metanarratives of powerful groups, and promote contestation of intergroup relations, exclusion and marginalization.

Bourdieu (1974, p. 32) argues that education ‘is in fact one of the most effective means of perpetuating the existing social pattern, as it both provides an apparent justification for social inequalities and gives recognition to the cultural heritage, that is, to a social gift treated as a natural one’. Social hierarchies are generally manifested in ethnic, caste-based or regional divisions in which opportunities for modern education and development are more likely to be seized upon by historically privileged sociocultural groups, leaving the poor and disadvantaged trapped at the margins without any prospect of social mobility.

With reference to the above examples from Rwanda and Ukraine, education can help preserve the metanarratives of powerful groups, and promote contestation of intergroup relations, exclusion and marginalization. Representing the beliefs and values of their identity groups, history teachers are inevitably positioned within battles over meaning, either facing

complicated encounters between representatives of various identity groups in their classrooms or representing marginalized or dominant groups themselves. By mobilizing history, those in power seek to legitimize present policies, define particular norms of behaviour and prescriptions of collective actions, demarcate social boundaries, enunciate foundations for protest and demand, and shape the distribution of power and authority (Alexander, 2004; Kern, 2009; Korostelina, 2017).

5.2 .3

EDUCATION AS LIBERATOR

Freirean philosophy believes in the awakening of critical consciousness ... through critical reflection on everyday power structures.

Education can be viewed through the lens of liberation, whereby the goal is for teaching and learning to promote emancipation from oppressive societal structures through transformation towards social justice and democracy. We would argue that at the heart of this educational current is

the field of critical pedagogy, founded by the Brazilian philosopher and educator Paulo Freire, in his seminal work *Pedagogy of the oppressed* (1970). Freirean philosophy believes in the awakening of critical consciousness (Freire, 1973) through critical reflection on everyday power structures. Beyond deeper understandings of one's personal circumstances, an important aspect of conscientization is 'praxis' – action-based change – which challenges oppressive power structures. Critical pedagogy has been critiqued and expanded upon. For example, there has been a greater focus on a critical pedagogy of place (Gruenewald, 2003), highlighting the importance of humanization – the process of 'becoming' in human development (del Carmen Salazar, 2013). There are, however, moral and ethical dilemmas around the potential use of violence that a liberatory education could potentially lead to and whether 'violence' can be justified as a form of resistance or defence for liberation. In human history, violence has been part of liberation



The necessity for marginalized populations to ‘transgress’ oppressive power structures, and co-create new collective narratives of human development, has been emphasized in the emergent concept of ‘transgressive learning’.

theology, and extremist groups in several parts of the world engage in education for radicalization (**Davies, 2019**). However, we see education as a liberator of the oppressed (**Freire, 1970**) as well as of the agents of oppressive systems, in which the role of education must be understood as a facilitator of social transformation. This would involve a transformative learning process, providing critical awareness of systems of oppression; dialogic space to deal with disagreements peacefully; and enabling to find cooperative solutions to contestations. In this sense, education as a liberator is interlinked with its role as a peacebuilder.

The connection between Freirean philosophy and conflict-affected contexts is made by Magee and Pherali (**2019**), who emphasize important contributions in peace education that do not just address current violence, but also the root causes of violence in terms of the structures and cultures that reproduce unequal power relations (**Galtung, 1990**). The necessity for marginalized

populations to ‘transgress’ oppressive power structures, and co-create new collective narratives of human development, has been emphasized in the emergent concept of ‘transgressive learning’. Examples include protagonizing community actors in non-formal grassroots learning (**Macintyre et al., 2020**), and the contextual aspects of pedagogical practices in the classroom, in resistance to the neoliberal educational paradigm (**Condeza-Marmentini and Flores-González, 2019**). Such a liberating perspective of education is particularly important in contexts such as Colombia (**Box 3**), where a peace accord has officially been signed, but where deep structural inequalities remain largely unaddressed. In the context of continuous violence, educators and learners can challenge the dominance of top-down policies through an emphasis on local dynamics and increasing inclusion of marginalized populations. This localized approach transfers the production of knowledge into communities’ everyday lives, promoting self-governance and empowerment (**Mac Ginty and**

BOX 3: EDUCATION AS LIBERATOR: POPULAR EDUCATION IN COLOMBIA, SOUTH AMERICA

Richmond, 2013; Mac Ginty, 2014; Korostelina, 2021).

Despite the fanfare surrounding the historic peace deal between the Colombian Government and the Revolutionary Armed Forces of Colombia (FARC) in 2017, officially ending fifty years of civil war, Colombia is experiencing deep socio-ecological challenges surrounding land tenure and a neoliberal system that exacerbates inequality and biodiversity loss. Given the importance of education in bringing forth the necessary transformations for more environmentally sustainable societies (**UNESCO, 2016**), a particular challenge for Colombia is its educational system (especially in rural areas), with low coverage, lack of quality and equity, and in need of becoming relevant for rural communities and responsive to the social and environmental needs

of its population (**Arango and Rodríguez, 2017**). Yet, in Freirean philosophy, Colombia has a tradition of participatory action research (**Borda, 2001**), which promotes a form of reflexive research and learning that addresses local challenges through action-based change. Often, in community settings characterized by marginalization, such learning can place participants as the protagonists of the learning process, transforming the ‘expert role’ of the teacher into one of facilitation (**Macintyre et al., 2020**). People learn through practical projects in their own community, with a focus on traditional knowledge, emotional learning and skills such as conflict resolution, whereby education becomes a tool for personal and community development. In this way, community-based learning (CBL) can help: decolonize educational paradigms through participation of different



In this process, the role of teachers, who engage in transformative educational practices by both empowering learners to challenge dominant structures and engaging themselves in social actions that problematize the status quo, is crucial.

ontological communities in learning processes (**Macintyre et al., 2020**); engage students in practical challenges that relate directly to their community (**Melaville, Berg and Blank, 2006**); and contribute to social

conflict and promoting reconciliation and coexistence in divided and post-conflict societies (**Haider, 2009**).

The cultural landscape of the classroom serves as a microcosm of the broader community within which the educational process takes place. Educational spaces involving both formal learning in schools as well as community-level domains of resistance to hegemonic structures offer hope for liberatory educational experiences. The idea that pupils and educators are passive recipients of hegemonic curricula imposed by the state and can therefore do nothing about the ‘banking model’ of education (**Freire, 1970**) and its role in reproducing social inequalities is

justice in teacher formation (**Farnsworth, 2010**). Because of its commitment to inclusion, participation and supporting community processes such as local governance, CBL plays an important role in mitigating

essentially flawed (**Pherali, 2013**). It is important to recognize that ‘resistance to the structural determinants of the education system can also emerge within the autonomy of a school, where the space of the classroom and of its surrounding communities can be exploited and expanded by educators in order to exercise counter-hegemonic pedagogies’ (**Pherali, 2013, p. 54**). In this process, the role of teachers, who engage in transformative educational practices by both empowering learners to challenge dominant structures and engaging themselves in social actions that problematize the status quo, is crucial. On the other hand, in deeply divided societies where there is a prevailing ‘conflict-ethos’ (**Bar-Tal, 2002, 2007**) culture means

that official initiatives that may aim to cultivate peace, mutual understanding and empathy are met with strong resistance (for a detailed analysis and further literature see **Zembylas, Charalambous and Charalambous, 2016**) (see also **WG2-ch8**).

Giroux, Freire and McLaren (1988) coined the term ‘teachers as transformative intellectuals’ who view themselves not merely as deliverers of the educational goals set for them, but rather as individuals with the intellectual agency to enhance the critical powers of their learners. They also suggest that ‘... teachers must take active responsibility for raising serious questions about what they teach, how they are to teach, and what the larger goals are for which they are striving. This means that they must take a responsible role in shaping the purposes and conditions of schooling’ (Giroux, Freire and McLaren, 1988, p. 126). Transformative teachers are conscious of their role as facilitators of social action in which they view schools as economic, cultural and social

sites that are closely linked with the issues of power and control. As described in ‘Education liberator’ above, teachers are more facilitators of collaborative and emancipatory learning than sources of ‘legitimate’ knowledge. They utilize learners’ lived experiences in their teaching and learning practice and inspire pupils to resist injustice and act proactively to take control of their learning. Teachers as transformative intellectuals possess a capacity to reflect critically and pursue conscious actions to achieve social justice.

In this way, community-based learning initiatives tend to speak more to the contextual needs of education, incorporating local and indigenous dimensions into how to live peacefully within communities. These localized responses to conflict may contradict top-down approaches to how education can support peacebuilding, due to an agenda driven by a logic of stability that benefits market orientations. While attention to universal values is important for education, a

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... education for peacebuilding is characterized by an action-oriented multidisciplinary learning process that goes beyond knowledge-based classroom activity around peace.

lack of recognition of grassroots knowledge/aspirations and homogenizing peace initiatives might be counterproductive.

5.2 .4

EDUCATION AS PEACEBUILDER

Like education for liberation, education for peacebuilding is characterized by an action-oriented multidisciplinary learning process that goes beyond knowledge-based classroom activity around peace. The aim of such an education is to build capacities in learners to interrupt the continuum of symbolic, structural and physical violence (**Galtung, 1976**). In this sense, the curriculum for peacebuilding demands critical classroom-based interactions with practical activities that relate to social, cultural and political issues that are based in local communities. Bush and Saltarelli (2000, p. 23) also note that peacebuilding education

should involve ‘a bottom-up rather than top-down process driven by war-torn communities themselves, founded on their experiences and capacities ... firmly rooted in immediate realities, not in abstract ideas or theories’. Gill and Niens (2014) provide a useful synthesis of diverse theoretical concepts in a framework for peacebuilding through education. They suggest that a ‘dialogic humanising pedagogy’ that builds on the foundations of critical theory and the Freirean pedagogy of participation, emancipation and transformation can overcome the limitations of the narrow economic model of education to inculcate fundamental attributes of humanity – love, compassion and humility (Gill and Niens, 2014).

Educational policies that promote equitable access to education can benefit socio-economically disadvantaged populations and potential ethnic tensions can be minimized. Schools can, for example, promote instruction in the mother tongue of the region, especially in early years, rather than impose a dominant

national language on minority groups. However, caution should be taken to ensure that children do not feel stigmatized through the public acknowledgement of their language practices (**Zakharia and Bishop, 2012; Bekerman, 2016; Charalambous et al., 2020**). Nevertheless, peacebuilding initiatives in conflict-affected environments lack explicit links to peacebuilding theories and tend to focus on immediate humanitarian needs with ‘a greater emphasis on protection and reconstruction’ rather than ‘transformation’ that ‘requires a more explicit commitment to political, economic and social change’ (**UNICEF, 2011, p. 7**). Here, the idea of transformation relates to what Galtung (**1976**) identifies as ‘positive peace’, a social condition that not only ensures the cessation of physical violence but also addresses forms of injustice, discrimination and structural violence. In this process, educational reforms are concerned with the potential contribution of education in mitigating conflict not only by enhancing human capital

and thus enabling economic growth through educational investment but also by increasing the capabilities of individuals to function successfully, such as by being safe, staying healthy, being educated, having employment and contributing to society (**Sen, 1999**).

Novelli, Lopes Cardozo and Smith (**2017**) adapted Nancy Fraser’s (**1995, 2005**) theory of social justice by combining the notions of redistribution, representation and recognition with an additional component of reconciliation in what they call the 4R framework. They use this framework to examine the underlying causes of conflict and promote peacebuilding through educational change in conflict-affected societies. The authors claim that education can promote peacebuilding through equitable distribution of educational resources and services; representation of diverse communities in educational decision-making; recognition of cultural diversity in the curriculum; and most importantly, promotion of conflict-sensitive



The most important area in which education can be instrumental in peacebuilding is through its enhanced role in promoting reconciliation.

and reconciliatory pedagogical approaches to address legacies of conflict (**Novelli, Lopes Cardozo and Smith, 2017**). In addition to promoting a culture of peace through teaching and learning, education has the potential to redress inequalities within the educational domain as well as at the societal level by adopting a social justice framework (**Fraser, 1995, 2005**). These principles of social justice are applicable in all contexts but particularly in contexts of mass displacement where refugees and internally displaced people are deprived of access to education (e.g. in Jordan, Lebanon and Syria), where the host governments are unable or unwilling to pursue policies of equity and parity of participation

in education.

The most important area in which education can be instrumental in peacebuilding is through its enhanced role in promoting reconciliation (**see Box 4**). This involves not only supporting educational and public debate about the legacies of conflict but also evaluating the extent to which historical and contemporary economic, political and sociocultural injustices are redressed in/through education (e.g. via quota systems, school relocation, textbooks, teacher allocation). Reconciliatory education can contribute to social integration and community cohesion by

BOX 4: EDUCATION AS PEACEBUILDER: COMMON HISTORY TEXTBOOKS IN NORTH-EAST ASIA

re-establishing trust between schools and communities as well as between different identity groups who may have been involved in past conflict (**Novelli, Lopes Cardozo and Smith, 2017**).

The common history textbook in North-East Asia is a collaborative work of nearly 50 Chinese, Japanese and South Korean scholars published in 2005 in the form of one history textbook intended for middle school students in each of the three countries. The textbook was published a few years after the Japanese Government endorsed several history textbooks that were considered factually inaccurate and extremely biased against other Asian nations – particularly China and South Korea (**Korostelina and Lässig, 2013**). After protests from the South Korean and Chinese Governments and the refusal of many Japanese teachers to use the controversial Japanese

history books, the Japanese Government agreed to work with the South Korean and Chinese Governments to produce a cooperative regional history textbook that would provide content and a narrative that all three nations could agree upon. To address conflicts in the region, the scholars agreed to present controversial issues from different perspectives and avoid judgements in the textbook. For example, Japanese and Korean participants disagreed strongly about the legality of various treaties signed between the two countries in modern times. The project participants decided to avoid taking sides and represent different narratives, leaving judgement to the readers. All other controversial topics were examined from all sides of the debate (**Yang and Sin, 2013**). This initiative has produced textbooks that teachers can use as complementary materials to standard history textbooks, though the uptake and impact of this requires



... it is necessary to address conflict-fuelling structural causes through a more interventionist, proactive and potentially transformative peace.

more research. The purpose of the resulting textbook is, incidentally, recognized in its subtitle, which is: 'Facing

the future using history as a mirror: building together a new framework of peace and friendship in East Asia'.

The book's use as a tool for reconciliation and peacebuilding is also highlighted in three separate prefaces written by editors from each nation and directed towards students in the other countries (*Korostelina, 2020*).

The 4R framework is a useful resource for analysing the interrelationships between education inequalities and conflict (*FHI, 2016*), and pathways to redress the inequalities. Further, it acts as an advocacy tool through which development partners, national governments, civil society organizations and school communities are able to reconceptualize education as a transformative process. It forewarns the potentially negative social and political outcomes of education unless provisions are made for education to be deliberately and programmatically

designed and delivered with the aim of paving the path for peaceful shared futures that address the visions of all groups in a society. More importantly, educational debates need to be informed by high-quality political economy analyses to better inform programmatic responses to implementation of the 4R principles in education where authoritarian regimes monopolize power and resources; hegemonic cultural groups dominate discourses about national identity; elite political classes resist representation of marginalized communities in educational decision-making; and the terms of reconciliation are hijacked by those in power. The point is that rather than traditionally technocratic 'do no harm' or stabilization approaches, it is necessary to address conflict-fuelling structural causes through a more interventionist, proactive

Peace education can promote the values of tolerance, acceptance and forgiveness which may be considered an integral part of ‘transformative peacebuilding’.

and potentially transformative peace. Such a deep transformation particularly focuses on redressing structural inequalities and injustices at system levels. This perspective assumes that a culture of peace can only result from an authentic process of transformation, both at individual and collective levels (**Clarke-Habibi, 2005**). Peace education can promote the values of tolerance, acceptance and forgiveness which may be considered an integral part of ‘transformative peacebuilding’ (**Lederach, 1997**). In various cases, illustrated in the text boxes above, tensions and possibilities relating to education can be examined by using the 4R framework, which could explain the rejection of education by Boko Haram; issues of recognition and identity politics in Ukraine; and popular education as a process of enhancing the idea of representation and history education in Japan, Korea and China to promote reconciliation.

Since 2000, there has been a significant growth in research and policy debates around education in emergencies as a

response to a broad range of challenges (e.g. access, quality of learning, attacks on children and teachers, lack of funding and technical capacities, etc.) faced by educational communities in humanitarian settings (**INEE, 2010; Burde et al., 2017; Burde, Lahmann and Thompson, 2019**). Thanks to the relentless advocacy of the Inter-agency Network for Education in Emergencies, there is now more recognition of the importance of education in humanitarian settings. And as a result of the Education Cannot Wait initiative, a dedicated funding mechanism has been established in the global education architecture. However, the field of education in emergencies has been criticized for its lack of engagement in broader critical education theories (**Novelli, 2019; Brun and Shuayb, 2020**) and for reproducing the status quo rather than advancing policy and practice for social transformation (**Shah, Paulson and Couch, 2020**). Hence, we argue that the analytical lenses presented in this paper are also relevant in educational planning, policies and practice in the field of education in emergencies.



5.2 .4 .1

SOCIAL COHESION AS PEACEBUILDING

Building upon the interactions between education and peacebuilding, we now turn to the idea of social cohesion, an important dimension of sustainable peacebuilding. Some theories that emerge from the analysis of links between aggregate years of schooling and social cohesion point out that education contributes to expansion of social and human capital which positively affect social cohesion (**Putnam, 2004**). However, this depends upon the extent to which the aggregate years of schools are distributed across diverse social groups. Social cohesion refers to two broad features of a society. Firstly, it refers to ‘the absence of latent conflict whether in the form of income/wealth inequality, racial/ethnic tensions, disparities in political participation, or other forms of polarization’ and secondly, ‘the presence of strong social bonds measured by levels

of trust and norms of reciprocity (i.e., social capital), the abundance of associations that bridge social divisions (“civil society”), and the presence of institutions of conflict management (e.g., a responsive democracy, an independent judiciary)’ (**Manca, 2014, p. 261**). Education can serve as a fundamental policy mechanism for governments to enhance social capital and social cohesion as more educated people cultivate wider, deeper and stronger social networks and tend to make more active contributions to society’s social and political processes (**Putnam, 2004**). Along these lines, Colenso (**2005**) points out three interlinked analytical approaches that promote social cohesion: (1) paying attention to the political economy and governance of education by promoting transparency and equitable participation in education policy formulation, planning and management in education; (2) making a concerted effort to promote equity and reduce inequality through redistribution of education resources and outcomes; and (3)

...analysis of links between aggregate years of schooling and social cohesion point out that education contributes to expansion of social and human capital which positively affect social cohesion.

... education should reduce causes of inequality and disparity and prevent feelings of marginalization and mitigate forms of injustice which often result in conflict and tension.

reforming teaching and learning practices with a particular focus on certain competencies that build trust and mutually beneficial relationships between students. These approaches align with the 4R framework discussed earlier and point out the processes through which education's role as peacebuilder can be enhanced.

Colletta and Cullen argue that 'social cohesion is the key intervening variable between social capital and violent conflict' (2000, p. 13). They posit that the greater the integration between social capital relating to vertical linking (i.e. state and markets serving communities and individuals by ensuring inclusion, rule of law, democratic participation, access to and equality of opportunity, efficient and non-corrupt bureaucracy, and open society) and horizontal bridging (i.e. reduction in gender-based, ethnic, caste, religious and regional inequalities), the more likely 'the society will be cohesive and will thus possess the inclusive mechanisms necessary for mediating or managing conflict before it turns violent' (Colletta and

Cullen, 2000, p. 13). On the contrary, weak social cohesion represents weaker 'reinforcing channels of socialization (value formation) and social control (compliance mechanisms)', therefore increasing the 'risk of social disorganization, fragmentation, and exclusion and the potential for violent conflict' (Colletta and Cullen, 2000, p. 13). On the one hand then, low social cohesion is fuelled by exclusion, authoritarianism, inequalities and corrupt bureaucracy, which increase the chances of conflict. On the other hand, high social cohesion, underpinned by inclusion, rule of law, vibrant representative democracy, mechanisms to ensure equity in political and economic opportunities, and tolerance for diversity, reduces the chances of violent conflict. Shuayb (2016, p. 230) argues that equality and justice are two important dimensions of social cohesion, highlighting that education should reduce causes of inequality and disparity and prevent feelings of marginalization and mitigate forms of injustice which often result in conflict and tension. In



this process, education is a major contributor to strengthening social cohesion through formation of human capital and expansion of social networks amongst more marginalized groups. More importantly, through inclusive curricular provisions, such as the teaching of more balanced history and recognition of different races, religions, ethnicities, castes and gender identities (**see section 2.4.1 on binational history initiatives**) education can not only address economic inequalities but also redefine social formation processes.

In post-war societies, restoring social services such as education demonstrates the capacity of the state to exercise its fundamental responsibility to look after its citizens, and hence, contributes to trust-building between the two entities. The provision of education also serves as a ‘peace dividend’ to the wider community, though only in circumstances where it is designed to ameliorate historical social division, inequality and discrimination. Where education has become historically exclusive and socially

... expanding educational opportunities to historically disenfranchized populations can, in the longer term, reduce social gaps, thereby enhancing the role of education as a

divisive, reforms in the education sector need to reflect inclusivity, equity and recognition of cultural diversity (e.g. local language, history, culture and values) in which excluded communities have genuine ownership of the educational provision rather than it being provided as state patronage or tokenism (**Smith and Ellison, 2015**). These processes are not only limited to teaching and learning, but more fundamentally to the 'structural changes to the education system itself, as well as administrative changes related to more inclusive participation, representation and recognition of various interests in education governance and decision-making' (**Smith and Ellison, 2015, p. 28**). In this sense, expanding educational opportunities to historically disenfranchized populations can, in the longer term, reduce social gaps, thereby enhancing the role of education as a peacebuilder. These may include protection of schools from violence; provision of scholarships for children from disadvantaged backgrounds; provision of school feeding programmes; free distribution of

books; recruitment of teachers and administrative staff from marginalized communities; allocation of resources to build schools in historically neglected areas; skills training for former rebels; and reforming school management committees to diversify representation. Schools can particularly focus on reconciliatory programmes that connect with local communities and begin to engage in wider debates about how to revise curricula to promote a balanced history of peoples and recognition of cultural diversity (**Novelli, Lopes Cardozo and Smith, 2017**).

From an educational perspective, Allport's (**1954**) contact hypothesis is a useful tool for bringing people together from across dividing lines and encouraging change in negative intergroup attitudes (e.g. reducing issues of stereotyping, prejudice and discrimination). Contact theory assumes that the lack of contact between groups promotes bias and prejudice, and over a period of time, differences are legitimized at social and political institution levels (**Allport,**



1954). This leads to reinforcement of negative attitudes towards the outgroup, further solidifying the boundaries between the ingroup and the outgroup (Hewstone and Greenland, 2000). Allport (1954) proposes four key conditions under which negative intergroup attitudes may be mitigated. Firstly, all members of contesting groups have a sense of equal status. As they engage in dialogue, they should feel listened to and that their opinions are valued by other members. Secondly, there is a collective commitment to achieving a goal of mutual understanding and peace. In other words, members of the dialogic team have the confidence or at least the hope that a mutually beneficial collective outcome is possible. Thirdly, all groups are interdependent and there is a willingness to cooperate as discussions take place. Finally, and most importantly, institutional support mechanisms that help facilitate the intergroup dialogue are put in place (Allport, 1954; Pettigrew, 1998). Educational spaces such as integrated schools have structural mechanisms and

'facilitating conditions' (Pettigrew, 1998) to promote such dialogues in safe environments where educational ethe speak to the idea of mutual understanding and horizontal collaboration. While some societal conditions might prevent integration as political forces draw support from identity-based groups to mobilize their actions, there may be grass-roots initiatives that try to navigate structurally divisive conditions to promote intergroup dialogues and educational spaces that can usefully serve that purpose. However, such contact should include considerations of power imbalances, informal practices of segregation, and persistent patterns of inclusion and exclusion (Pettigrew and Tropp, 2013; McKeown and Dixon, 2017).

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attitudes

Bridging the divide between social groups can be achieved by the introduction of a new or existing social category that unites groups across social boundaries of conflict (Brewer, 2000; Crisp and Hewstone, 2000). For example, young members of conflicting ethnic groups can be brought together

A safe, secure context will potentiate a mode of self-regulation known as ‘reflective mode’, which is characterized by a high level of executive functioning and strong volitional control of attention.

through special educational initiatives like youth festivals, sport events and extracurricular activities (photo-clubs, music, etc.). Another approach – supercategorization – aims at the creation of a new, broader identity that helps oppositional groups identify the shared space of their belonging. New identities can be formed by creating one group with several subgroups. In this case, members of the new group have a dual identity, one of which is connected to the new common group and the other reflecting membership in a subgroup. On the basis of a positive balance of differences and similarities, all members of the new group have positive attitudes and stereotypes towards others. If people continue to perceive themselves as members of different groups but also feel that they are members of a common large group, intergroup relations become more positive in comparison with the context of a single ingroup and single outgroup (Dovidio and Gaertner, 2004).

As the next section will illustrate, from a neuroscience perspective, a safe, secure context or a threatening, unsafe context will have different effects on stress physiology throughout the lifespan, but particularly in infancy and early childhood as the central nervous system is developing. The ability to self-regulate depends on the context in which a child is situated. A safe, secure context will potentiate a mode of self-regulation known as ‘reflective mode’, which is characterized by a high level of executive functioning and strong volitional control of attention. This is in contrast to the ‘reactive mode’ of self-regulation, which is characterized by a high level of emotional and motoric reactivity. Educational environments that promote conflict sensitivity, diversity and inclusion can enable children to develop a reflective mode and individual agency. These developmental processes are crucial in appreciating peaceful ways of dealing with differences



5.3

Social and biological responses to conflict: implications for learning

Education can also be a site where learning experiences are characterized by victimization of learners, perpetration of structural and physical violence, or building a community for social transformation and peace. In the first two, conflict can have disastrous consequences for educational systems and for the process of educating students.

In the latter two, conflict can be seen as an opportunity to remake the educational process and the educational system. This section of the chapter illustrates the reciprocal relationships between biological and social processes and applies these to an analysis of within-person processes at the neural and physiological levels in conflict-affected societies.

5.3 .1

BIOLOGICAL RESPONSES TO CONFLICT

Conflict, whether violent or not, is inherently stressful for all participants as well as the educational system. We argue that victimization of education can stimulate adverse reactions among learners and can be detrimental in two ways. Firstly, learners who are more emotionally reactive and less reflective as a result of their conflict experience might struggle to deal with differences in a non-adversarial manner, resulting in reproduction or exacerbation of long-term confrontational behaviours (**Blair and Ursache, 2011; Blair and Cybele Raver, 2012**). This is particularly the case if conflict is experienced early in life, but also during adolescence, when the central nervous system is rapidly developing and can flip the brain and the behaviour it underlies

to more emotionally reactive and less reflective responses to stimulation (**Arnsten, 2009**). Secondly, there are often negative effects on the normal routine of educational provisions (e.g. when educational processes are disrupted or schools are destroyed during armed conflict) and rebuilding systems after conflict is slow and challenging with sustained effects on societies. When education acts as a liberator (e.g. the experience of unleashing individual potential and providing agency to effect social change) and a peacebuilder (e.g. providing knowledge and skills to deal with the causes of intergroup tension), stress and threat can be turned into positive resources to promote resilience and capabilities to develop reflective thinking and peaceful ways of dealing with conflict (**see also WG3-ch2** on brain development and stress).

The mechanism by which the brain is flipped to a more reactive and less reflective mode (and vice versa) is the physiological response to stress. When an individual is experiencing

Conflict, whether violent or not, is inherently stressful for all participants as well as the educational system.



The mechanism by which the brain is flipped to a more reactive and less reflective mode (and vice versa) is the physiological response to stress.

stress, chemicals are produced throughout the body that act as neuromodulators, meaning that they, in part, control the rate at which neurons fire in the brain. When the neuromodulators are at moderate levels, individuals are alert and prepared for the typical challenges of the day. At very high levels, however, indicating that the person is under considerable stress, the neuronal firing in brain areas associated with emotional reactivity is greatly increased. Alternatively, the rate of neuronal firing in the area of the brain that is associated with reflective responses to stimulation, that is, the prefrontal cortex (PFC), is greatly decreased. In fact, at sustained high levels of these neuromodulators the rate of neuronal firing in the PFC enters a state of what is known as synaptic long-term depression (LTD), as opposed to long-term potentiation (LTP) (**de Kloet, Oitzl and Joëls, 1999; Ramos and Arnsten, 2007**). This is important because as LTD is occurring in the PFC and no new neuronal connections are being formed and strengthened, LTP is occurring and new connections

are being formed and strengthened in brain areas associated with emotionally and motorically reactive responses to stimulation as opposed to reasoned and reflective responses to stimulation.

Research on neuroimaging among children in conflict-affected societies is scarce; however, understanding of adverse circumstances to which children in such settings are exposed and the evidence from more stable contexts indicate that the impacts can be lifelong. A fundamental fact of brain function and development is ‘cells that fire together, wire together’, meaning that experience is a powerful influence on many aspects of brain development and, in turn, behavioural development (**Hebb, 1949; Hensch, 2005**). It is important to remember that human behaviour and the nervous, endocrine and immune systems that underlie human behaviour are highly adaptable early in development. Thus, a fundamental principle of development in all organisms is that the development of self-regulation will occur in

In unsupportive and unsecure contexts such as those characterized by conflict, children will have an increased tendency to develop physiological responses to stress that favour reactive as opposed to reflective responses to stimulation.

ways that are appropriate for the context in which development is occurring (**Gottlieb, 1997**). In supportive, secure and nurturing contexts, children guided by caregivers will develop a well-regulated physiological response to stress that can support reflective rather than reactive responses to stimulation. In unsupportive and unsecure contexts such as those characterized by conflict, children will have an increased tendency to develop physiological responses to stress that favour reactive as opposed to reflective responses to stimulation.

The developmental distinction between reactive versus reflective responses to stimulation is important because reflective thinking skills, known collectively as executive functions (EF) are essential for progress in formal education contexts (**Bull and Scerif, 2001; Blair and Razza, 2007; Jacob and Parkinson, 2015**) (see also **WG3-ch3** and **WG3-ch5**). EF are comprised of three component processes: (1) working memory – the ability to hold information in mind and update it; 2) inhibitory control

– the ability to inhibit a highly learned response to a stimulus in favour of a less dominant response; and 3) cognitive flexibility – the ability to attend to distinct but closely related aspects of a given set of stimuli, such as the ability to group objects by colour and then by shape (**Blair, Zelazo and Greenberg, 2005**). Educational research on memory points out that ‘educative processes’ should be transformed into spaces of contestation and negotiation rather than reproduction of ‘memories’, formalized and imposed by authorities where educators can exercise their agency to decode underlying motivations of dominant historical narratives to provide a more balanced description of the past (**Paulson et al., 2020**). This, in our view, is an appropriate approach to advance the role of education in breaking away from cultural reproduction to harness possibilities for recognition and justice.

EF are engaged whenever complex and potentially confusing information is encountered. This fact illustrates the idea that EF are



5.3 .2

IMPLICATIONS FOR EDUCATIONAL PRACTICE FROM BIOLOGICAL RESPONSES TO CONFLICT

reciprocally related to emotional responses to stimulation, such as stress and trauma. In other words, as anxiety rises in response to complex and potentially confusing information, levels of stress hormones rise at moderate levels, which can facilitate neural activity in areas of the brain that underlie reflective thinking. However, the rise of stress hormones at very high levels can shut that neural activity down. As described above, EF can be overridden by strong emotional, that is, stressful, responses to stimulation. However, as children develop EF, they can use these abilities to regulate emotion and the physiological response to stress. In other words, as children acquire agency and the ability to think abstractly with the development of EF, they also develop the ability to exert top-down control over their actions as opposed to responding in a ‘stimulus-driven’ manner to the context in which they are situated. As children develop and mature, they are increasingly able to anticipate contextual cues that can be used to guide behaviour.

Knowledge of relationships between stress, trauma and EF can inform efforts to introduce educational innovations that work to enhance the role of education in liberation and peacebuilding.

Knowledge of relationships between stress, trauma and EF can inform efforts to introduce educational innovations that work to enhance the role of education in liberation and peacebuilding. At the classroom level, there are relatively straightforward innovations to nurture a culture of peace that can be implemented to structure classrooms and pedagogical approaches to encourage the development of effective self-regulation such that engagement in learning is facilitated. For example, educational innovations that promote children’s individual

Evaluations of mindfulness programs have demonstrated a decrease in student aggression, problems with self-control, inattentiveness, perceptions of psychological stress, behavioural problems, conduct disorders, school suspensions and substance abuse, and increases in academic achievement, social skills and mental health.

agency by ceding some measure of control to children in decision-making about which classroom activities to engage in and which learning opportunities to prioritize, even for very young children, can increase self-regulation and EF by allowing children to take ownership and ‘liberate’ their learning. Evaluations of a number of prekindergarten and kindergarten programmes have demonstrated such an effect with sustained impact in later primary grades (Cybele Raver et al., 2011; Blair and Cybele Raver, 2014; Sasser et al., 2017).

Mindfulness is also an effective tool for reducing stress by increasing individual agency in a way that can promote reflective thinking and reduce reactive tendencies. Mindfulness refers to ‘both a mental state and a set of practices that are characterized by two components: the self-regulation of attention, so that it is maintained on immediate experience, thereby allowing for the increased recognition of mental events in the present moment; and

the adoption of an orientation towards one’s experiences in the present moment, characterized by curiosity, openness, and acceptance’ (Suárez-García et al., 2020, p. 1). Evaluations of mindfulness programmes have demonstrated a decrease in student aggression, problems with self-control, inattentiveness, perceptions of psychological stress, behavioural problems, conduct disorders, school suspensions and substance abuse, and increases in academic achievement, social skills and mental health (Creswell et al., 2014; Pascoe et al., 2017; Pandey et al., 2018; Suárez-García et al., 2020). The benefits of mindfulness training for teachers have also been empirically demonstrated. Evaluations of the Cultivating Awareness and Resilience in Education (CARE) programme have shown positive effects on teachers’ social-emotional well-being and competence as well as classroom quality, as indicated by the emotional climate of the classroom (Jennings et al., 2013, 2017; Jennings, 2018). The CARE programme is based on the theory of the ‘prosocial classroom’ and



... ‘mindfulness’ programs are beneficial in coping with the immediate effects of conflict whilst the broader initiatives of conflict prevention and systemic change are underway.

its potential benefits for students as well as teachers (Jennings and Greenberg, 2009). Despite the potential benefits of such programmes in enabling learners to navigate and manage pressure, attention should not be deflected from the need to redress the societal structures that cause stress. The idea that education systems should promote resilience through biological or emotional interventions while societal structures remain oppressive is problematic. Nevertheless, ‘mindfulness’ programmes are beneficial in coping with the immediate effects of conflict whilst the broader initiatives of conflict prevention and systemic change are underway.

Research on mindfulness makes clear that EF are dependent on many other aspects of child development, such as the ability to regulate emotion and physiological responses to stress. Therefore, empirical demonstrations of the relation of EF to progress in school involve a host of processes related to emotion regulation, not becoming

anxious in the face of uncertainty and not acting out when bored or uninterested. In effect, self-regulation generally ensures beneficial social interactions with teachers and peers. This idea is particularly relevant in educational environments of crisis, where teachers, parents and children have lost stability in their lives, are forced to live in stressful political and social conditions with a blurred life trajectory, and struggle to maintain a meaningful educational provision for young people.

5.3 .3

SOCIAL NEUROSCIENCE PERSPECTIVES ON CONFLICT

In order to understand the impact of conflict on education via effects of stress physiology, it is necessary to focus on how conflict affects the caregiver–

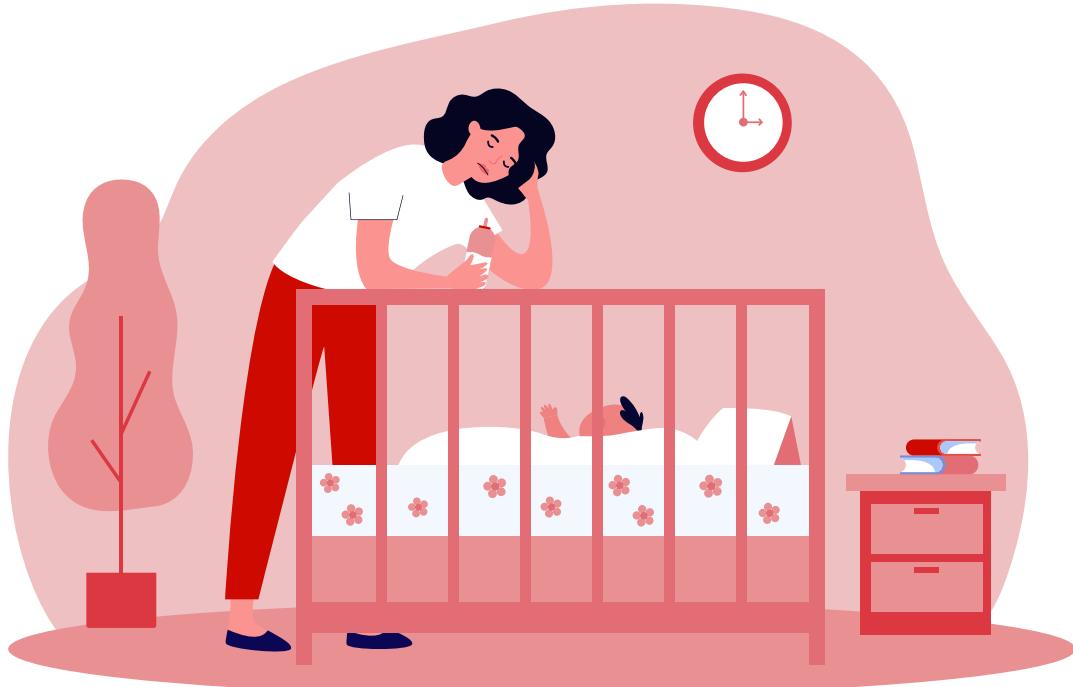
... the caregiver-child relationship in [establishes] a strong basis for learning in school. This is because the caregiver-child relationship is the foundational relationship that sets the stage for all subsequent social relationships.

child relationship from infancy. An infant is fully dependent on their caregiver for all aspects of physiological regulation, including body temperature, feeding and sleeping. Caregivers are actively entraining the developing child's physiology in ways that will ultimately support or undermine their ability to effectively regulate physiologically (Feldman, 2015, 2017). These multiple forms of regulation include physiological responses to stress, which will ultimately decide the balance through which reactive versus reflective responses to stimulation are prioritized (Blair and Cybele Raver, 2015; Brandes-Aitken et al., 2020).

The extent to which formal education is dependent on social interaction between teachers and students, as well as between peers, further highlights the role of the caregiver-child relationship in establishing a strong basis for learning in school. This is because the caregiver-child relationship is the foundational relationship that sets the stage for all subsequent social relationships.

This is seen in the vast empirical literature demonstrating the centrality of the caregiver-child relationship in child social-emotional and cognitive development, particularly for children who experience neglect and marginalization on the basis of their race/ethnicity or income (McLoyd, 1998). It is also seen in a burgeoning literature on the neuroscience of relationships in which hormones, neuropeptides and catecholamines organize and shape connections between cortical and subcortical networks in ways that influence relations between caregivers and children (Feldman, 2017).

The caregiver-child relationship sets the stage for one of the key relationships in a child's life – that of a child's relationship with their teacher when they begin formal schooling. There is a substantial literature on the importance of the student-teacher relationship that in some studies has been shown to have longitudinal effects throughout children's primary school careers (Hamre and Pianta, 2001; Mashburn and



(Pianta, 2006). A particular area of research interest that is relevant to education in conflict-affected societies is the extent to which teachers' physiological profiles indicate high stress and reactive as opposed to reflective cognitive, emotional and behavioural profiles. This information about stress physiology could then be used to evaluate the efficacy of programmes that aim to increase individual agency through mindful practices or ceding some measure of control to children in the learning process. An important point here is that children are not 'incomplete and

incompetent ("becomings" or "citizens in the making") who need protection and cannot be granted full rights and traditional participation options' (Toots, Worley and Skosireva, 2014, p. 54). They equally utilize educational sites for political socialization and wider social issues; the struggles of their parents and political environments also provide powerful informal education that shapes children's interactions with conflict. Children and young people do organize, mobilize the support of their peers and comrades and act collectively, which 'at the very least confound(s) a "care and control"

model of childhood' (Wyness, 2006, p. 94). It is also possible that young people collaborate with their teachers to change educational environments for the better.

The benefits of mindfulness training for teachers as well as students could perhaps be enhanced by integrating mindfulness and social neuroscience. Social neuroscience is the study of the neural basis of collective social behaviour, such as interactions between teachers and students, and includes both positive behaviour (e.g. empathy, cooperation, altruism) and negative behaviour (e.g. prejudice, aggression, violence). Theoretical perspectives gained from neural investigation of the positive and negative aspects of social behaviour might contribute significantly to our understanding of different stages of conflict, that is, the causes and effects of conflict, mitigation of the impact of violence and peacebuilding efforts. However, any meaningful success in translating the neuroscientific evidence to real-world applications would require

successful integration of top-down political, social and cultural causes of violent conflicts with bottom-up psychological and neural bases of individual emotion and cognition (Decety, Meidenbauer and Cowell, 2018; Cybele Raver and Blair, 2020).

An especially important avenue of research from the social neuroscience perspective is that of empathy: the ability to understand and share the emotional and cognitive states of others (see also WG3-ch4). Empathy is a key social relational function that acts as a pathway to higher-order prosocial behaviour and includes bond formations, cooperation and mutually acceptable moral decision-making. The role of neuroscience in conflict-affected societies (at behavioural, neural and hormonal levels) is best seen through the lens of empathy-mediated response bias towards ingroup and outgroup members. Long-term peacebuilding requires transforming the perceptions that conflict actors have about their perceived enemy by replacing negative images of

The benefits of mindfulness training for teachers as well as students could perhaps be enhanced by integrating mindfulness and social neuroscience.



The role of neuroscience in conflict-affected societies (at behavioural, neural and hormonal levels) is best seen through the lens of empathy-mediated response bias towards ingroup and outgroup members.

them with a sense of sympathetic understanding, that is, compassion for the enemy's vulnerability, hardship and suffering (**Rothbart and Allen, 2019**). Specifically, the neuropeptide oxytocin enables cognitive and emotional empathy and plays a substantial role in empathic flexibility towards ingroup and outgroup members (**Shamay-Tsoory et al., 2013**).

Oxytocin is also implicated in trust and bond formation, parent-child attachment and cooperative behaviour (**Kosfeld et al., 2005; Zak, Stanton and Ahmadi, 2007; Israel et al., 2009**). There is methodological controversy regarding the findings from intranasal oxytocin studies on human social behaviour but recent studies have been working to address these methodological drawbacks (**Mierop et al., 2020; Winterton et al., 2021**).

The evidence in support of ingroup and outgroup bias in the human brain indicates bias emerges through complex interactions between large numbers of brain networks performing multilevel cognitive processing (**Victoroff et al., 2011**;

Zhong et al., 2017). These neural networks act as a substrate for social, cultural, economic and political influences in the surrounding environment. Identifying clusters of recurring neural, sociocultural and political factors linked to increased susceptibility to engaging in behaviour directed at other groups, whether those behaviours foster inclusion or exclusion, can inform tailoring of rehabilitation strategies to help modify aggressive behaviour.

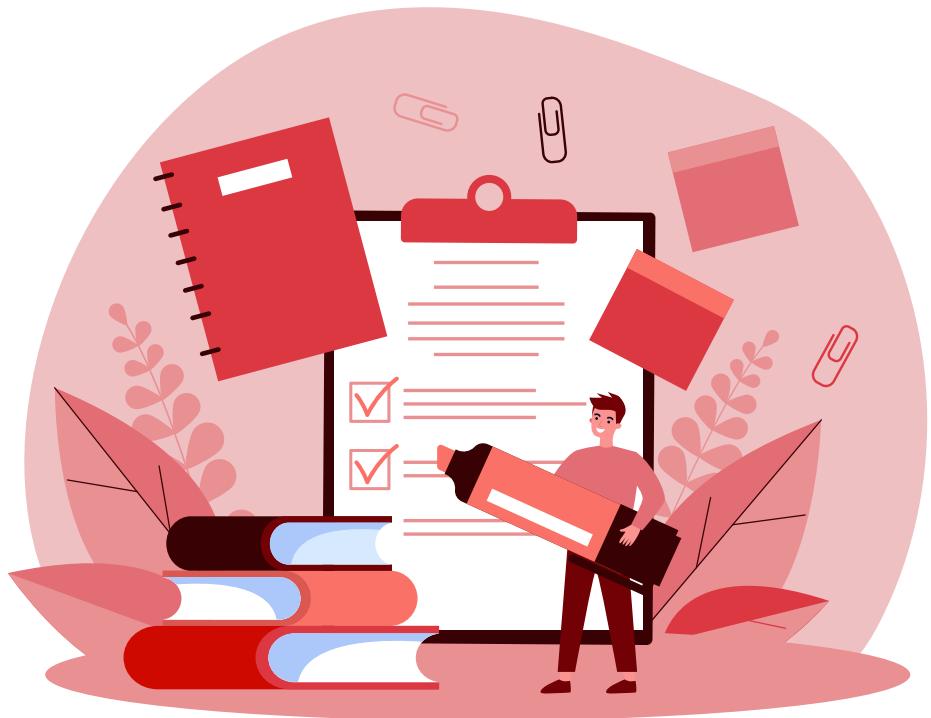
A study investigating intergroup contact intervention for peacebuilding used 'The Tools of Dialogue Intervention' as a group-level intervention with Israeli-Jewish and Arab-Palestinian adolescents (sixteen to eighteen years) for a period of eight weeks (**Influs et al., 2019**). The study design involved video-recorded one-on-one interactions with outgroup members and measured self-reported attitudes towards the outgroup before and after the intervention. Considering its role in prosocial behaviour, oxytocin levels were

Neuroscientific evidence can only suggest potential educational intervention strategies and provide evidence at the biological level of the efficacy of these strategies.

also assayed before and after the intervention. The study found a concurrent increase in perspective-taking responses and oxytocin levels in the group receiving the intervention, indicating that oxytocin might play an important role in mediating an increase in behavioural empathy towards outgroup members following dialogue intervention. This understanding has wider implications for pedagogical processes in educational settings where learning takes place through collaborative and dialogic activities rather than via didactic transmission of knowledge or information. This finding illustrates a major theme of the neuroscience sections of this chapter, namely that biology is determined by context and experience as much or more than it determines a specific context or experience. In line with the central theme of this chapter, the findings of the study also illustrate that education in the form of meaningful intervention can build empathy among intergroup members and act as a liberator and a peacebuilder to override

the antagonistic worldviews in youths of intergroup conflicts that are built through years of formal and informal contexts (including education acting as a victim and a perpetrator).

It is important to note here the distance that still remains in bridging neuroscientific findings and educational policies and practices. Understanding how conflict affects the physiology and psychology of victims is not sufficient to build successful educational practices. Neuroscientific evidence can only suggest potential educational intervention strategies and provide evidence at the biological level of the efficacy of these strategies. It is one of the many nodes of the entire decision-making tree that needs to be integrated with the sociodemographic, political and cultural nodes to arrive at a meaningful impact. Translation of neuroscientific evidence from laboratory environments to real-world conflict areas is emerging but the opportunity cost and relevance should be thoroughly examined by all stakeholders.



5.4

Towards a multidisciplinary analytical framework for education in conflict settings

Social, political, economic and cultural environments influence the neural and physiological

mechanisms of educators and learners in educational settings. Educational interventions that

Education can help build resilience, an adaptive response to adversity among learners.

are designed to promote reflective mode in human minds can strengthen positive emotional and neural mechanisms and can help learners to cope better with the effects of violence. But these are transitory approaches and the root causes of stress are located in wider societal environments that may be oppressive, exploitative and unjust to those who are outside the system of privilege.

Violent conflicts are disruptive to educational processes and cause stress and adversity for learners, meaningful learning and brain development. Whilst it is crucial to mitigate societal conditions that generate causes of conflict, conflict-sensitive learning can potentially reduce the impact of violence on human brains. Education can help build resilience, an adaptive response to adversity among learners.

Education is a contested domain that shapes, and is shaped by, a broad range of social, political, economic and cultural dynamics in conflict-affected societies. The idea that education is

inherently good for conflict mitigation and peace is unhelpful particularly because the way educational decisions are made, and how resources are allocated in education across societies, determine the relationships between individuals, social groups, the state, markets and political institutions. Educational decision-making is often monopolized by the political elite who undermine redistributive policies and representation of diverse communities in educational processes (e.g. policy-making, resource allocation, equity, diversity and curricula). Hence, education becomes an indirect cause of conflict, fuelling grievances. This seems to be the fundamental problem of the centralized education system from a conflict perspective. It is therefore essential to find new avenues of learning through which education can become a universally available good that provides a liberating experience for all. An educational focus on diversity with equity, starting prior to formal schooling and continuing through the



... how resources are allocated in education across societies, determine the relationships between individuals, social groups, the state, markets and political institutions.

early primary grades, can lay foundations for a system of learning that promotes peace and social justice.

The theoretical framework and its four strands of multidirectional interactions between education and conflict employed in our analysis should be viewed as a dynamic and heuristic tool to unpack tensions inherent in education. These relationships often intersect and are blurred, making it difficult to specify any one direction of analysis in any

particular context. Therefore, this framework should be applied as an entry point of educational analysis rather than a mechanical or rigid approach to solving educational problems. This would, we hope, enable researchers and policy-makers to engage in cross-cutting debates about how education presents itself as a complex process in both stable and conflict-affected societies, and the possibilities to transform education from victim and perpetrator to liberator and peacebuilder.

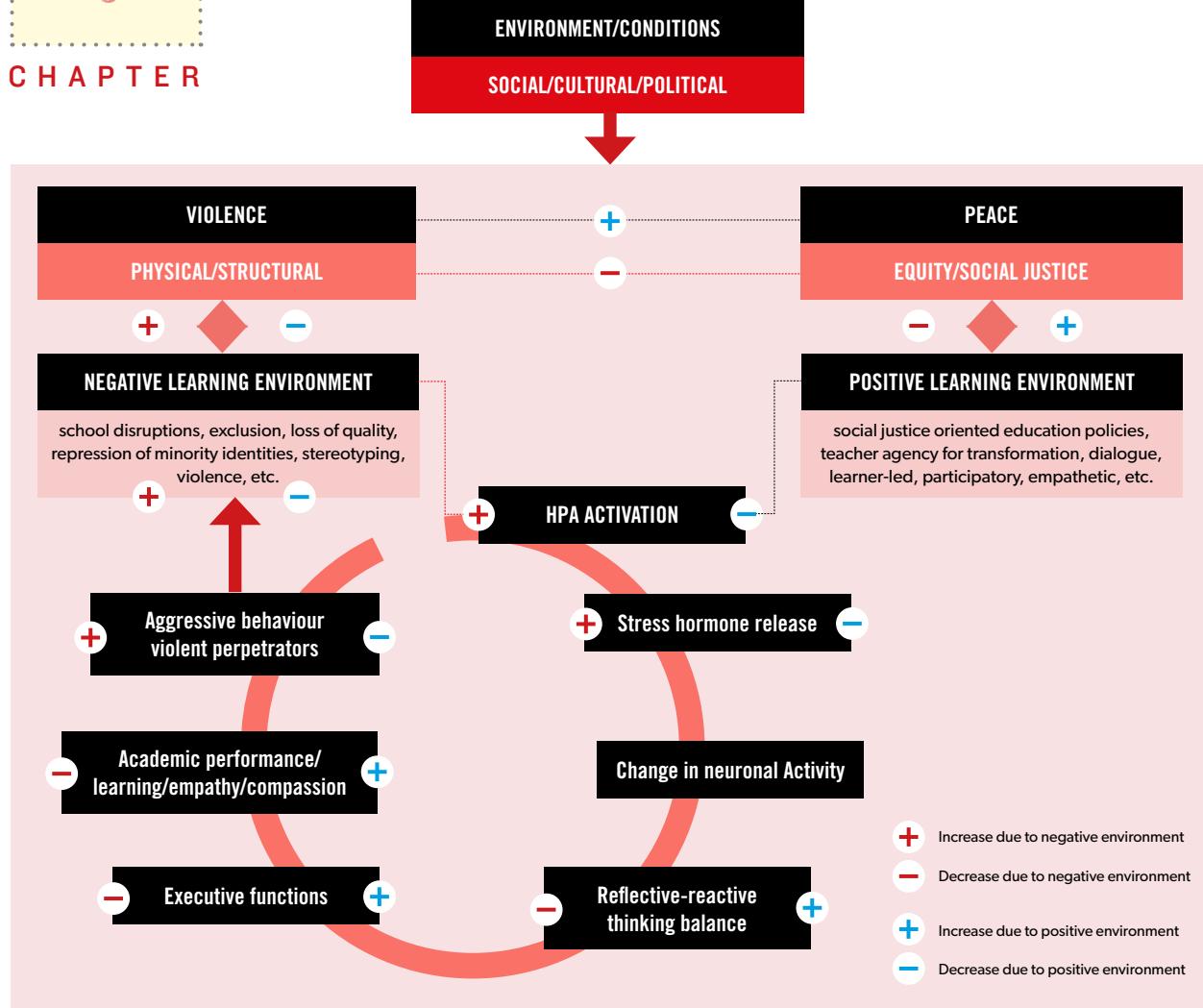


Figure 1. The relationship between contextual educational factors, and the biological pathways by which individuals react to conflict-induced stress

An important means to unpacking the social tensions in education is to bring together research and researchers across the aisles of natural and social sciences as well as to appreciate the peculiarities of diverse educational contexts. On the one hand, positive change in the educational environment

can lead to enhanced cognitive abilities of learners contributing to more peaceful ways of dealing with differences. On the other hand, the effects of violence on the learning environment can cause stress for learners with a long-term detrimental impact on their cognitive abilities and social



behaviour. Interesting avenues for further research include exploring how the neural state of individuals can be shaped by their experiences in the social/educational environment, which can then determine their response to the social, political and cultural conditions that relate to the outbreak and perpetuation of conflict. In line with this conclusion, we present our edu-neuro conceptual framework in **Figure 5**.

The red plus and minus signs indicate an increase or decrease of a factor due to a negative environment, while the blue plus and minus signs indicate an increase or decrease of a factor due to a positive environment. The figure starts with a particular context leading either to a negative learning environment of physical or structural violence, or to a positive learning environment of social justice, equity and peace. Both of these consequences result in a biological response of hypothalamic-pituitary-adrenal (HPA) activation, and stress hormones being released, resulting

in a change in neuronal activity. These changes result in a cascade of downstream effects in reflective/reactive thinking balance, and EF, which affects a learner's academic performance, empathy and compassion. Depending on the positive and/or negative contextual factors taking place at each stage, behaviour manifests itself as aggression (the perpetrator), disempowerment (the victim), increased critical thinking (the liberator) or increased empathy/compassion (the peacebuilder). This is a continuous feedback cycle, where there are possibilities for educational interventions to positively transform neuronal activity leading to improved cognitive and behavioural attributes.

As outlined in **WG2-ch4**, there are multiple types of diversity: religious, ethnic/racial, linguistic and socio-economic, as well as diversity associated with variations in neural structure and function, political views and gender. It is crucial to cede educational decision-making to diverse groups, particularly marginalized

The red plus and minus signs indicate an increase or decrease of a factor due to a negative environment, while the blue plus and minus signs indicate an increase or decrease of a factor due to a positive environment.

A neuroscience perspective on conflict highlights the importance of agency, of individuals as well as groups.

groups, including indigenous communities, to nurture a positive learning environment (**Figure 5**), ensuring that those groups have the tools, support and guidance they require to make decisions about education at all levels, from early childhood through to higher education.

A neuroscience perspective on conflict highlights the importance of agency, of individuals as well as groups. It also emphasizes that when education acts as a liberator and a peacebuilder it enhances the potential for education to function as a ‘great equalizer’, as one manifestation of a truly meritocratic society whereby access to opportunity for resource generation is equitably distributed throughout the population.

A focus on diversity with equity and inclusion of marginalized groups and neurodiverse learners has explicit advantages for education. Teacher agency is also key in that educators are not mere implementers of the state-prescribed curriculum but are creative thinkers who are able to

combine the lived experiences of their communities with the curricular framework. From a conflict perspective, teachers who have the potential to engage in transformative pedagogies are provided with pedagogical freedom to deal with contentious social and political issues in the safe spaces of learning institutions. Where the culture of learning is defined not just by prescriptive employability skills but also by the objective of unleashing learners’ creativity and innovative power, education can effect societal transformation. In this process, educational practices are adapted to new environments created by the impact of conflict and violence, and are geared towards peace and social cohesion. Within the controlling national political contexts, teachers can exercise some degree of autonomy and engage in critical history teaching. They can create positive dialogic spaces where students are able to appreciate that historical narratives do not represent truth but have a hidden/explicit political agenda, and therefore need to be critically understood.



5.5

Conclusion and Key Messages

Educational policies and practices in conflict-affected contexts should approach education from multiple perspectives and draw upon multidisciplinary research, including sociology, conflict and

peace studies, political science, and neuro and cognitive sciences in order to avoid excessive 'educationism'. Some of the critical points we suggest include:

CHAPTER

... promoting peacebuilding through structural reforms in education and implementing educational programmes at schools and communities to deal with legacies of conflict

- *establishing learning and teaching processes that promote resilience to reduce victimisation,*

understanding psycho/neural/physiological dimensions, and introducing programmatic interventions;

- *promoting social justice in education to reduce its negative role.* Policy-makers, international development partners and educational practitioners should concentrate on equity in resource distribution so that disadvantaged communities have increased access to and outcomes in education;

- *reconfiguring processes of educational decision-making*

in which there is diversity of representation from different social groups who have collective ownership for policies and practices;

- *designing educational curricula to recognize cultural diversity.*

There are immediate programmes that mitigate grievances of historically marginalized communities and a broader

programme of structural reform is set in motion;

- *promoting critical consciousness* to inculcate egalitarian values and provide tools to redress injustice; and

- *promoting peacebuilding through structural reforms in education* and implementing educational programmes at schools and communities to deal with legacies of conflict.

Based on the discussion in this chapter, we highlight the following implications for various educational stakeholders in conflict-affected contexts.

5.5 .1

GENERAL IMPLICATIONS

1. While government institutions must continue to be a part of the solution in improving education,



Local educational institutions could become ‘centres of community’, facilitating sustainable development, engaging with the causes of conflict and developing innovative experiential learning models that bring the reconciliation know-how of a community into the classroom and take that knowledge into communities and society at large.

the emphasis should be on grass-roots activities, including cross-national common history initiatives.

2. Local educational institutions could become ‘centres of community’, facilitating sustainable development, engaging with the causes of conflict and developing innovative experiential learning models that bring the reconciliation know-how of a community into the classroom and take that knowledge into communities and society at large. In this regard, school–community partnerships are crucial so that learning and teaching in schools and community-based experiences are connected.

3. There must be recognition of the fact that in societies affected by identity-based conflicts, education faces an enormous task of redressing injustices, unequal distribution of power and resources, and misrecognition of diversity.

4. Reconciliation programmes within education can avoid

curriculum content that reproduces prejudice and incites violence and hatred, and instead promote tolerance, mutual understanding and justice.

5. In conflict-affected contexts, education is particularly significant in the development of psychosocial dimensions of resilience such as patriotism, optimism, social integration and trust in leadership (Canetti et al., 2014) as well as in enhancing the capacity of a national community to heal from trauma, promoting justice for victims of violence, and positively transforming intergroup relations among communities.

5.5 .2

IMPLICATIONS FOR PARENTS AND CAREGIVERS

1. Research indicates that secure and stable parent–child relationships are characterized

Teachers are not simply facilitators of the prescribed curriculum; their roles go beyond curriculum delivery in conflict-affected settings.

by frequent parent–child conversations and the asking of open-ended questions. A child’s ability to think abstractly and to reason must be respected. Children should be encouraged to reflect on their behaviour and engage in conversations about reasons, motivations and positions that have led to a particular type of behaviour. The power differential between parent and child must be used sparingly.

2. Parents could focus on conversations of hope and new possibilities amid times of conflict and protracted crises. Whilst it is often challenging to conceal emotions, grief and helplessness in situations of crisis, families should concentrate on co-creating a positive future that enables trauma to heal and a culture of imagination to thrive.

3. Parental involvement in children’s learning has a positive impact on educational outcomes. So, parents should regularly interact with their children’s teachers and identify domains (e.g. academic, psychosocial and

emotional) in which children might be struggling. Proactive partnerships and collaborations between teachers, parents and learners can lead to positive outcomes in education.

5.5 .3

IMPLICATIONS FOR EDUCATORS

1. Teachers are not simply facilitators of the prescribed curriculum; their roles go beyond curriculum delivery in conflict-affected settings. They could educate learners to critically engage with social, political and economic conditions of the society in which they live; provide the knowledge and skills to analyse conflict; learn skills about how to be safe; and play a positive role in peacebuilding.

2. In addition to inculcating positive values such as love, compassion, tolerance and respect for diversity, teachers should



Teachers could utilize knowledge about peace education/genocide education/Holocaust education to educate children about the consequences of prejudice, hatred and ethnic supremacy and promote mutual understanding and the importance of cultural diversity and coexistence.

promote diverse perspectives, critical thinking and a culture of dialogue in the class.

3. Research indicates that the substantial knowledge base on self-regulation and EF could be emphasized. These topics are highly relevant to education at all grade levels, particularly early childhood education and early primary grades. Educators could draw on this body of knowledge to inform their pedagogical practices.

4. Teachers could utilize knowledge about peace education/genocide education/Holocaust education to educate children about the consequences of prejudice, hatred and ethnic supremacy and promote mutual understanding and the importance of cultural diversity and coexistence.

5.5 .4

IMPLICATIONS FOR POLICY-MAKERS

1. Transitional justice and resilience in education should be promoted to reduce feelings of victimization. Schools could be provided with resources and toolkits to introduce programmatic interventions that promote an understanding of psycho/neural/physiological dimensions.

2. Education policy-making bodies could be representative of diverse social, regional, cultural, racial and religious communities.

3. There are important implications for national ministries of education that manage teacher education programmes. Initial teacher education and continuing professional development programmes could be revised to incorporate new discourses and approaches that will help teachers

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C H A P T E R

6

Education technology

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This chapter assesses how technological innovations are emerging as one type of solution to the global educational challenges of the 21st Century. It surveys across a broad typology of technologies in the information and communication domain, discussing their scope and affordances in traditional and non-traditional learning, curriculum design and instruction. With an overview of trends, benefits, and risks posed by recent technological advances in education, the aim of the chapter is to present a balanced view of the education technology (EdTech) field, highlighting the relevant and necessary concerns within the different spheres of EdTech. Specifically, the chapter discusses critical issues of the digital divide, equitable access to EdTech, privacy and security concerns, the role of teachers and real-world classrooms in an increasingly digitized education setting, and debates concerning the ethical use of artificial intelligence, big data analytics and machine learning. The assessment supports an optimistic but cautionary role for EdTech in addressing education challenges when coupled with continued social and cultural context-driven research. With respect to policy, the assessment concludes that it is worthwhile to encourage innovations and implementations of EdTech globally, accompanied by sensible regulatory guidelines on data sharing, breach of privacy, security, misuse and misrepresentation of claims about what EdTech can and cannot do.

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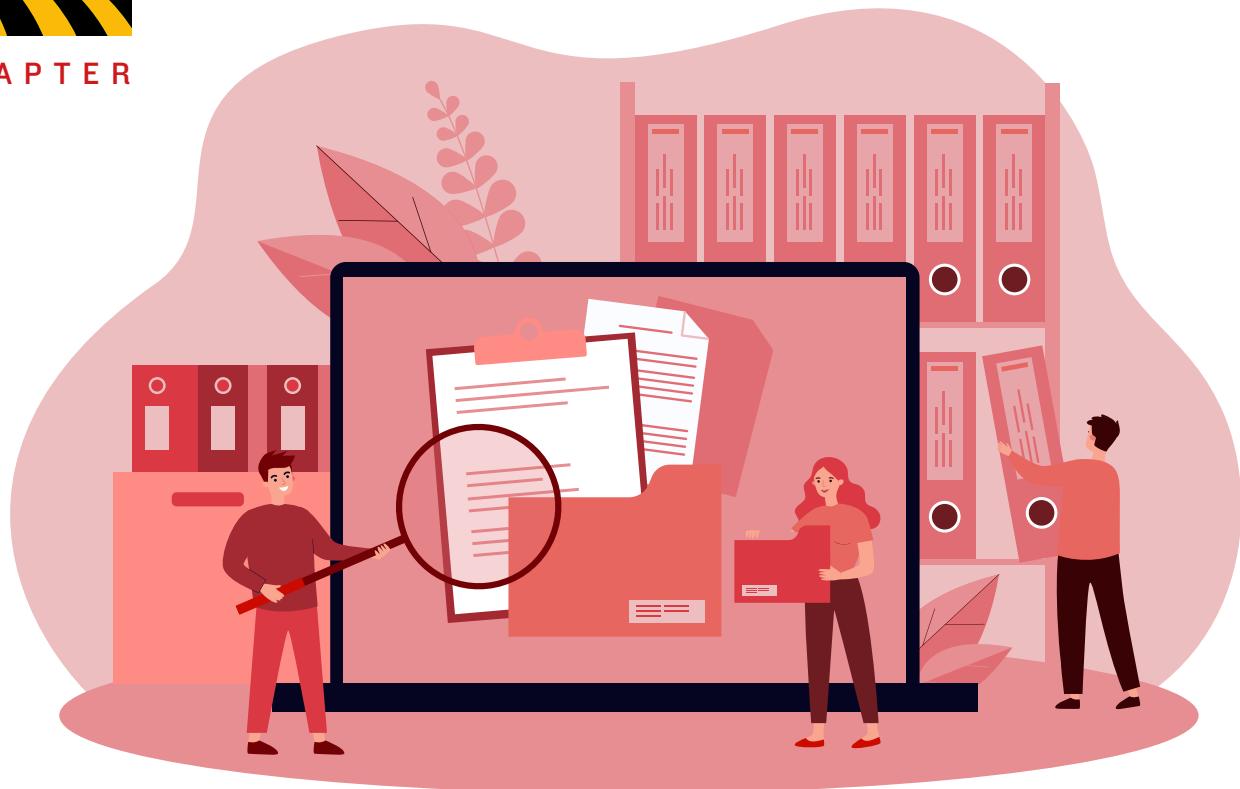
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6.1

Introduction

Throughout history, technology has played an instrumental role in the development of humanity – from cave paintings to the development and use of tools, from the printing press and the telephone to the internet connecting billions across time and space. Having entered an age of profound environmental and social change, technology has

become a pervasive context across all education settings (**Spector, 2001**). Education technology (EdTech) holds many promises for addressing longstanding educational debates and technical problems: allowing access to quality educational resources for individuals with specific disabilities or challenges that impact their learning in traditional





Like many human endeavours, technological advances and solutions hold both promise and peril when applied to educational contexts.

school settings, to communities that are geographically remote, to populations in economic need; enhancing the role of teachers and other educators in supporting human learning; or bringing balance and harmony to the sometimes discordant philosophies of education as engines of economic prosperity versus education as an ecosystem of human flourishing. Thereby EdTech plays its part in promoting diversity, lifelong learning and equitable quality education for all individuals.

There is an inherent tension among stakeholders of education that devolves into debates about trade-offs, constraints and limitations: to achieve gains in one direction requires losses in the other. However, this need not be a zero-sum game, and careful planning and consideration can achieve a balance between the two. Technology-enhanced systems can be such game-changers.

It is, however, noteworthy that, despite the optimism of some promoters and enthusiasts,

EdTech alone is not a panacea for all the obstacles facing education. Like many human endeavours, technological advances and solutions hold both promise and peril when applied to educational contexts, depending on the thoughtfulness and care brought to the application and implementation in real life. For example, EdTech promises to increase the efficacy and value of teachers, revolutionize individualized learning, reduce administrative burden, and improve overall retention and learning of students with the aim of promoting human learning and achievement. At the same time, it also proves often to be just the opposite, disrupting traditional roles and responsibilities, increasing administrative burden and surveillance, and distancing teachers from the traditional social interactions with students. In this chapter, we keep these two counterfactual forces at the forefront as we review different types of EdTech. We present cases where EdTech is used, for example, to achieve a balance between human learning towards

Many scholars have argued that rather than tools and gadgets, technology is both human and a fundamental driver that transforms societies and values experience.

an end of increasing human capital versus human flourishing; and assess the critical issues that need to be considered, debated and resolved by the human actors entangled in the design, development, diffusion and use of EdTech.

How do we define technology and, specifically, EdTech? Many scholars have argued that rather than tools and gadgets, technology is both human experience (Heidegger, 1977; Ihde, 1993; McCarthy and Wright, 2004) and a fundamental driver that transforms societies and values (Ellul, 1954/1964). Consequently, EdTech becomes conducive to changing and enhancing the learner experience while materializing human flourishing. However, for every enhancement brought about by technology, there is a risk of displacement, disruption or destruction of some kind; every magnification can be accompanied by a reduction (Ihde, 1993), so there will always be the need to consider alternatives or monitor unintended consequences in order to minimize anticipated and

unanticipated risks of introducing EdTech in an educational context.

This chapter acknowledges that technologies can be tools that transform education, and discusses the adaptation, opportunities and challenges they pose to educators and learners (Fishman and Dede, 2016). The chapter simply and broadly defines EdTech as any technology applied in an educational context or as a solution to an educational problem. By this definition, any process or tool may become EdTech through its purposing and use. While many of us may automatically think of the internet and the laptop as EdTech, it is important to remember that a textbook is a traditional EdTech designed for the purpose of teaching a topic or subject area, while an ancestral technology could be rituals around the fire – learning about humanity's relationship with nature (Macintyre et al., 2019). We describe a range of technologies that are widely discussed in EdTech research, with special attention given to information and communication



technologies (ICTs) as instantiated with digital tools, artifacts, networked communications platforms, and cloud-based computing and storage. Our focus on digital technologies is underlined by the speed and volume with which they are occupying the educational space and the rapid and uncertain ways with which they are influencing human development and the environment. However, we do not neglect brief reviews of less well-publicized technologies that are emerging in research and development (R&D) centres across the world, such as various new forms of artificial intelligence (AI)-augmented learning, lest their

infusion into products, processes and services and their consequent impact are not noticed or debated by education stakeholders until they are already integrated and transforming educational ecosystems.

The chapter starts with a brief history of EdTech, followed by a typology and scoping of technologies. We then examine EdTech in education proper, identifying emerging themes and issues of application, and sampling recent developments in EdTech along with descriptions of how these technologies are being researched and applied to

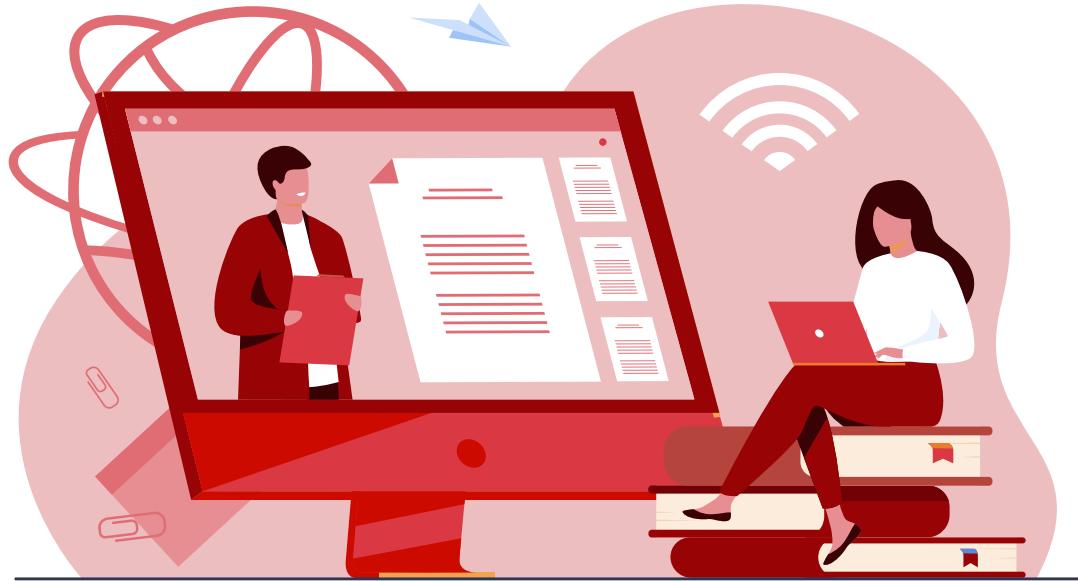
... we must acknowledge that journals and reports on EdTech stemming from development and research in Western countries exert a strong influence on which questions are asked and most studied.

education. Following this review, we take a critical lens to synthesize some of the issues that reveal both the promises of and future challenges for EdTech.

A methodological note is in order at this point. In this chapter, we take a multidisciplinary approach and attempt to be inclusive of research and contexts from around the world, bearing in mind the shadow on the research literature known as the ‘WEIRD problem’ (the dominance of samples from Western, highly educated, industrialized, rich and liberal democratic countries and regions). That is, the majority of psychological and educational research in journals (**Arnett, 2008**) employs college-level student samples that ‘not only fail to generalize to the world at large but also are especially atypical and unrepresentative’ (**NASEM, 2018**, p. 317; see also **Henrich, Heine and Norenzayan, 2010**; **Rad, Martingano and Ginges, 2018**). The chapter contributors have collaborated across different academic fields in the natural and social sciences to formulate the integration and

synthesis of multidimensional perspectives on EdTech. We also believe that the multicultural background of the authors, spanning four different continents, contributes significantly to the development of a more holistic assessment of EdTech in the global space. That said, we must acknowledge that journals and reports on EdTech stemming from development and research in Western countries exert a strong influence on which questions are asked and most studied (**Arnett, 2008; Thalmayer, Toscanelli and Arnett, 2021**).

This chapter is neither a meta-analysis nor an exhaustive literature review but rather a broad perspective on EdTech in anticipation of future application and diffusion into education systems. Our approach to this chapter also reflects the uneven diffusion across the world of both EdTech itself and research about it, coupled with a recognition that there is limited generalizability of research conducted in one setting, context, social or historical moment and culture (**NASEM, 2018**).



6.2

History of EdTech and the Delors Report

One can trace the intertwining of technology and literacy and learning through innovations in writing and mathematical notation systems and various inventions; notable examples are affordable paper production, moveable type, the printing press, the slide rule, the calculator and the ballpoint pen. However, the history of EdTech coincides with modern (twentieth century to the present), formal training

and schooling contexts. The earliest example of EdTech using electronic and digital media/tools was educational radio prior to the First World War (**Bates, 1984**). Early innovations in broad consumer and military technologies such as slide shows and retro-projectors were readily adapted for use in education in the early twentieth century (**Saettler, 1968; De Vaney and Butler, 1996**). The inception of EdTech as a main instructional

delivery modality came with the foundation of Open University in the United Kingdom (UK) in the early 1970s, and the use of computers in education with programming, drill and practice became widespread (**Manguel, 1996**). The use of ‘computer technologies’ to support learning was pioneered and reported by Atkinson and Shiffrin as early as 1968 (see **Bransford, Brown and Cocking, 2000**). The late 1980s to early 1990s witnessed the popularization of computer-based training with multimedia (e.g. CD-ROM) in schools and universities. Internet-based instruction started in the 1990s, which was followed by e-learning well into the early 2000s (**Fletcher, 2009; Graesser, 2013; Weller, 2018**).

Today, we cannot take for granted that the network neutrality of the internet and its influence on education will remain as it is now..

A plethora of new technologies, such as open-source, social media, virtual environments and AI, have been adopted by education, and are turning education into places and spaces of technological convergence (see **WG3-ch7** for further discussion on digital places in education). That is, there is a tendency towards the

integration of previously unrelated technologies and participatory culture (**Jenkins, 2007**). The very systemic structure of technology has been going through a steady stream of radical changes. Today, we cannot take for granted that the network neutrality of the internet and its influence on education will remain as it is now, such as the case of blockchain, which will increasingly affect financing and investing in education, implementing instructional projects, certification/accreditation systems and the monitoring of learning outcomes with distributed ledgers (**Cacioli, 2020; Park, 2021b**).

ICTs are one of the central themes of the ‘**Delors Report**’, a landmark report to UNESCO of the International Commission on Education for the Twenty-first Century (**International Commission on Education for the Twenty-first Century, 1996**). While ICTs and peripherally related digital technologies stand out, it is important to acknowledge the legacy of multimedia technologies that continue to be used around the



world for education delivery. For example, the infrastructure built to support educational television and radio programmes established over several decades remains important in several societies. India's NCERT, for instance, has a large, channel-like structure which still offers extensive programming today. Nepalese radio education also has a long tradition (**Holmes, Karmacharya and Mayo, 1993; Pradhan, 2012**). Community radio programmes produced by disadvantaged children in Senegal and South

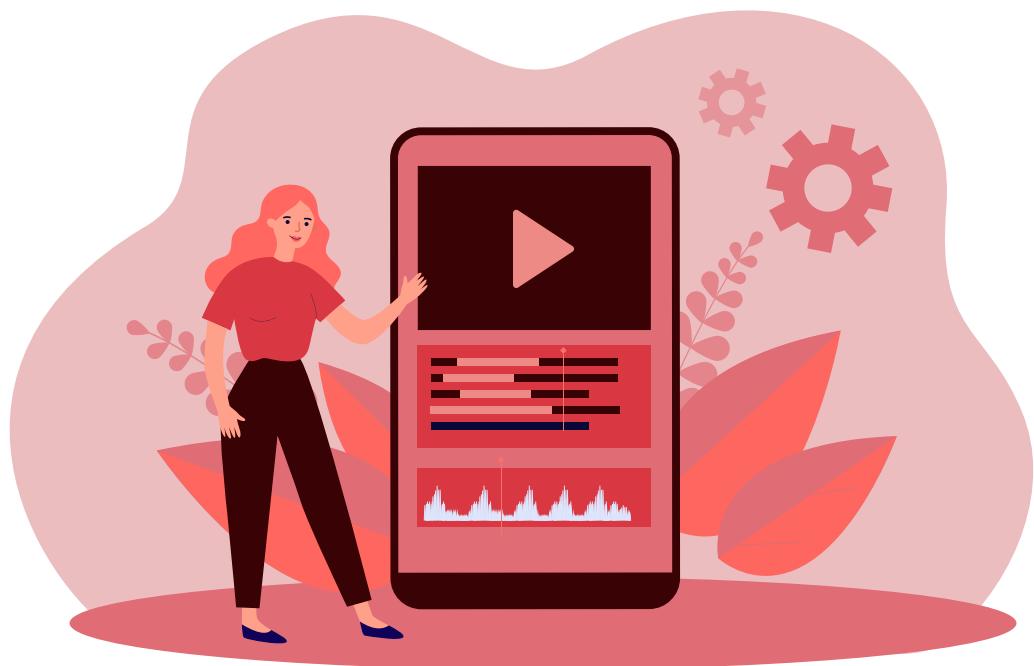
Africa contribute to their identity formation while promoting peace and reconciliation (**Bosch, 2007**). In Afghanistan, UNICEF is using radio to teach children in violence-affected zones. In the United States (USA), the public broadcasting service (PBS) has provided children's educational television programming since 1969 when it debuted Sesame Street; this has resulted in multiple international co-productions, and PBS continues to develop televised and internet hybrid programmes to support children's learning

While there has been an impressive growth in ICTs, related disparities such as the digital divide between the rich and the poor has resulted in problems of access and quality of usage that continue to pose challenges for global education.

(Mares and Pan, 2013; Fisch, 2014; Kearney and Levine, 2015). More recently, during the COVID-19 pandemic, a number of governments have used television channels to air educational programmes (Alvi and Gupta, 2020; Özer, 2020; Ramabrahmam, 2020).

Returning to the **Delors Report**, we acknowledge three key facets of technology – ICTs in particular – reported by the Commission that deserve to be revisited and reassessed: (1) the crucible of knowledge production and dissemination in science and technology; (2) the tension between technology and social justice; and (3) the centrality and future direction for education systems and international cooperation surrounding EdTech. The Commission identified technology as a currency and an instrument in the push and pull inherent to economies amidst fast globalization. Aiming at international cooperation, for example, the Commission highlighted the importance of ‘the quantity and quality of traditional teaching materials

such as books, and on new media such as information technologies, which should be used with discernment and with active pupil participation’ (**International Commission on Education for the Twenty-first Century**, 1996, p. 31). While there has been an impressive growth in ICTs, related disparities such as the digital divide between the rich and the poor has resulted in problems of access and quality of usage that continue to pose challenges for global education (**Scheerder, van Deursen and van Dijk**, 2017; Yuen et al., 2017; Park, 2021a). The science and technology gap between ‘developed’ and ‘developing’ countries (**International Commission on Education for the Twenty-first Century**, 1996, p. 34) is still being breached today. The infrastructure for ICTs, especially a stable, reliable internet, is not a universal, worldwide achievement, within or across regions. Until such a time that societies provide such universal access and coverage, technologies will need to be adapted to address local inequities in infrastructure and service.



6.3

Types and scope of EdTech

A selective and non-exhaustive typology of technologies relevant to EdTech can be organized around their efficacy and impact while being mindful of fast-paced technological innovations with their affordances, opportunities and risks, and often unpredictable and transformative consequences. An illustration of a transformative innovation might be the keyboard for typing, which accelerated the spread and use of print literacy in comparison to handwriting. Another example is the touchscreen or finger-driven

display. After its invention by Johnson in 1965, Samuel Hurst's resistive touchscreen, developed in 1970, provided the foundation for the later innovation and adoption of smartphones and tablet devices (Ion, 2013).

In EdTech, one driver of inventions, innovations and adoptions has been the desire to serve those with individual differences that interfere with participation in customary social or educational settings. Both

Through assistive technology, for example, children with special education needs are able to access the general education curriculum.

perceptions of and responses to digital device environments have been adapted and enhanced by attending to individuals with physical and mental disabilities (Wehmeyer et al., 2012; Meyer, Rose and Gordon, 2014). Through assistive technology, for example, children with special education needs (SEN) are able to access the general education curriculum (Chambers, 2019; Vincent-Lancrin and van der Vlies, 2020). There are different kinds of assistive technologies that can be adjusted to inclusive classroom settings, for example, if a child has a visual impairment, they can opt to use text-to-speech functionality to gain skills and independence (Maich and Hall, 2016). Other notable examples of assistive technologies for those with SEN are tactile interfaces for the blind or visually impaired, visual displays for the deaf or hearing-impaired, and alternative response modalities for those with loss of or limited mobility or movement (Hersh, Leporini and Buzzi, 2020). The evolution of universal design principles, which codify how and when to apply EdTech to support

learning, represents the state of the art in aspiring to technologies that do not exclude based on individual differences but rather attempt to circumvent such differences (Al-Azawi, Serenelli and Lundqvist, 2016; Capp, 2017).

We now turn to a discussion of ICTs, which serves as a convenient shorthand typology in organizing the review that follows. We review current developments in ICTs in reverse order – technology, communication, information – expanding on each category as warranted.

6.3 .1

TECHNOLOGY: HARDWARE/DEVICES/ ROBOTS/VIRTUAL WORLDS

At the outset of the computing era, large, centrally located mainframes (computation and



Another branch of technological innovation has been directed at perception and motoric functions, with increasing advances in both sensitivity and precision, as well as intelligent feedback looping that mimics advanced cognition.

data storage) were accessed via a distal terminal consisting of an input (keyboard, programming card) and output (initially a printer, later a monitor screen). Ironically, we have almost come full circle, with computing power distributed across networks, allowing for the sharing of computation between a local device and distal servers. Similarly, storage is shifting to ‘the cloud’, a euphemism for external server storage of data. This allows for a variety of user interface devices ranging from classic (though thinner) high-definition monitors, tablet-sized screens, phones, watches, eyeglasses and virtual-reality goggles, the latter creating a simulation of three-dimensional (3D) space for the wearer. Research is underway using a computer-vision-driven system that runs a 3D ‘digital twin’ of the classroom (Zhang et al., 2014). Thus, a teacher can see a whole class without instrumenting any of the occupants to obtain it. Researchers are implementing this in both controlled studies and real-world classroom deployments with promising results (Anonymous, 2018).

An emerging area of EdTech research concerns the impact of 3D printing on education (Szulzyk-Cieplak, Duda and Sidor, 2014; Papp, Tornai and Zichar, 2016; Song, 2018). Through different digital interfaces, 3D printers facilitate expression of learners’ experience of a multidimensional world and allow them to emulate and (re) create it. There is evidence of 3D printers’ impact in diverse education contexts and regions, for example, as an instructional tool for teachers (Song, 2018); for special education (Buehler, Kane and Hurst, 2014; Buehler et al., 2016); and in arts-restoration education (Short, 2015).

Another branch of technological innovation has been directed at perception and motoric functions, with increasing advances in both sensitivity and precision, as well as intelligent feedback looping that mimics advanced cognition (Goldberg et al., 2017). At the basic end of this spectrum, nearly all digital devices now come standard with audio-video embedded in their hardware. While these innovations can support various

Fingerprint identification serves both a privacy/security function for the individual, but also creates the risk of confidentiality and privacy invasion.

individual differences that impact learning (e.g. for the blind/visually impaired or the deaf/hearing impaired), they can also be used as management, surveillance and control tools that raise issues of confidentiality and privacy. Whether an individual is assured of when they are being recorded is not always transparent to the user. Eye-tracking technology ([Anonymous, 2018; Ashraf et al., 2018](#)) is relatively cheap and easy to install on a laptop computer, giving perhaps an ominous cast to the notion that eyes are the windows of the soul. For example, D'Mello et al. ([2012](#)) developed a system that tracked whether the learner was paying attention to the computer screen while learning and automatically gave feedback to the learner when the eyes went off-screen ([Hutt et al., 2017](#)). Of course, even legacy broadcast technologies can be reversed – using cameras or audio-recording to monitor students, teachers and classrooms. Fingerprint identification serves both a privacy/security function for the individual, but also creates the risk of confidentiality and privacy invasion. Motion

detectors, analyses of facial expressions and biometric sensors are used to infer our mental and emotional states ([Calvo and D'Mello, 2010; D'Mello and Graesser, 2010](#)), benignly for engagement and motivation, but other less admirable applications are easily imagined.

In addition, social robotics is an emerging field, opening up a world of human-like physical and emotional tutors and companions ([Breazeal, 2009; D'Mello and Graesser, 2012; Breazeal et al., 2016](#)). Biometric sensors and global positioning system locators extend technologies not only to anywhere we happen to be but make inferences to our emotional states as we learn and experience. These seemingly science-fiction-inspired devices are currently being researched in laboratories, but there is every reason to believe that creative engineering applications will, in the coming decades, bring consumer or open-source programs that will accelerate wider dissemination.



6.3 .2

COMMUNICATION AND COLLABORATION

As we write this chapter, the world continues to be in the midst of a pandemic that has, in many countries, resulted in the closing of schools and a move to the virtual, remote classroom, or a hybrid model that combines the two (virtual or distance education and in-person, classroom learning) (**Cox and Laferrière, 2021**). Despite decades of distance education models and implementation, the reality of enforced distance learning has caught many educational providers, parents and communities by surprise (**Education Week, 2020**). In addition, where technological infrastructures support it (such as in the USA and South Korea), the presence of communication platforms such as Zoom has engendered creative and arguably productive continuity in the face of crisis. Hybrid models of in-person and remote/virtual

education have been trialled. Higher education institutions, in particular, have increased training courses for faculty in the use of effective instructional design principles for delivering content and maintaining student engagement and self-directed learning in computer-mediated environments (**Rashid and Asghar, 2016**).

Two lines of research have been drawn upon to support the massive efforts of virtual and remote learning in the face of the pandemic. Firstly, decades of research on distance education, including massive open online courses (MOOCs), have led to insights into the affordability and challenges of learning at a distance (**Gaševic, Dawson and Siemens, 2015; Qayyum and Zawacki-Richter, 2018; WG3-ch7**). Secondly, research into computer-supported collaborative learning (CSCL) has focused on the quality of interactions when learners are brought together to learn. Järvelä and Hadwin (2013) note that CSCL technologies, when carefully designed using collaborative learning principles,

Despite decades of distance education models and implementation, the reality of enforced distance learning has caught many educational providers, parents and communities by surprise.

are effective in enriching learning interactions and creating opportunities for sharing and constructing knowledge among group participants (**Ludvigsen et al., 2010**); they have also been associated with changes in both individual and collective collaboration outcomes (**Salomon, Perkins and Globerson, 1991; Sottilare et al., 2018**). Not to be overlooked in this regard is the voluminous sharing of content, lessons and activities by and for educators. For example, the University of Colorado Boulder hosts the PhET Interactive Simulations project, which according to the University's website, provides over 150 free interactive mathematics and science simulations, over 2,500 lessons submitted by teachers, translations into 94 languages and over 784 million simulations delivered (**PhET, 2020**).

Not to be overlooked in this regard is the voluminous sharing of content, lessons and activities by and for educators.

It is difficult to draw conclusions from the forced, global social experiment in remote learning, and it is even daunting to comment upon it. What we can hope for is a change or shift in mindset from believing that all

education must take place face-to-face to designing what affords the best opportunity and context for student learning. Some will no doubt wish to go back to the traditional, in-person school and classroom structures as the sole or primary location for learning. But this industrial-era model of education delivery has not been working for specific subpopulations in most country settings. For example, in the USA, the disparity in reading performance between African-American children and their white peers has persisted for over thirty years, despite numerous technological enhancements in schools (**McFarland et al., 2019**). The traditional classroom and school model was built upon assumptions of societies that existed over a century ago, and economic and technological change has shifted those assumptions. Many social and commercial institutions have already shifted towards accommodating remote workers and workplaces. The dominance of a socio-economic system where caretakers go to a workplace is shifting, which offers the



The explosion of information in the digital age has arguably been accompanied by an explosion in the means for generating, sharing and evaluating knowledge.

opportunity to reconsider whether children going to a physical school is the only or best option for learning.

6.3 .3

INFORMATION: THE INTERNET

The World Wide Web was invented in 1989; the first browser and version of HyperText Transfer Protocol and the first browser and version of the HyperText Markup Language occurred in 1990. By 2005, there were over 1.1 million websites, by 2013 there were over 600 million, and by 2016 there were over 1.7 billion.

The explosion of information in the digital age has arguably been accompanied by an explosion in the means for generating, sharing and evaluating knowledge. To take one critical example, for decades, education reformers have been attempting to move teachers away from the primary

role of knowledge conveyer or ‘sage on the stage’ towards a role of fostering a more student-centred ‘guide on the side’. Perhaps this paradigm shift is attributable, at least partially, to the sheer volume of information that is currently available and still growing exponentially. For example, while Wikipedia as an information source enjoys different rates for reliability and credibility depending on the age and professional profile of its users, it is increasingly respected for its very open system of editors and source citations to update and amend errors (**Korfiatis, Poulos and Bokos, 2006; Flanagin and Metzger, 2011; Fitterling, 2014**). Its policy of allowing its users to create, edit, contest and revise the content may not be perfect, but it approaches trustworthiness reasonably and transparently, according to a philosophy of participatory and peer-reviewed content.

In our information-intensive society, every human can be regarded as a ‘station’ in a network of knowledge, either decentralized or distributed, partaking in

The influence of AI and other advanced digital technologies on EdTech requires careful attention because there is widespread uncertainty about and speculation on how these new technologies will influence people's lives and education.

the collective intelligence and capacity-building in a networked society (Castells, 2009; Cornu, 2005; Siemens, 2005). Skills and strategies of search, navigation and evaluating source relevance and credibility are thus foregrounded in any information-processing task (Rouet and Britt, 2011; Britt and Rouet, 2012). In education, the ability to properly handle information is known as 'information literacy' and it involves the ability to:

- determine the nature and extent of the information needed;
 - effectively and efficiently access information that is required;
 - evaluate information and its sources critically and incorporate the information into the personal knowledge base and value system;
 - summarize and synthesize the main ideas to be extracted from the information and construct new concepts;
- use information effectively to accomplish a specific/ethical purpose (American Library Association,

2000).

The circumstance of the twenty-first century is that multiple source evaluation is a prerequisite to learning and understanding; information must be evaluated, cross-validated and integrated, aligned with an epistemology that gaining knowledge is a work in progress and never universal and, hence, open to falsification (Popper, 2002). This modern context has significant implications for how we prepare students to access and understand information (Bråten et al., 2011).

6.3 .4

BEYOND ICT

The influence of AI and other advanced digital technologies on EdTech requires careful attention because there is widespread uncertainty about and speculation on how these new technologies will influence people's lives and education (Elliott, 2017; Yang, 2019; Aiken and Epstein, 2000). It is beyond



the scope of this chapter to cover the rapid and dynamically changing landscape of new digital technologies evolving in the EdTech world, but we identify the following four loci to monitor.

6.3 .4 .1

DATA SCIENCE AT SCALE

The collection of data through EdTech is dramatically increasing in volume, breadth and depth (NAEd, 2017). Further, EdTech enhances the organization and materialization of data collection (Lefever, Dal and Matthíassdóttir, 2007;

Leonardi and Vaast, 2016). At the upper bound, one can imagine a data repository for millions of students and citizens, each of whom has an associated comprehensive learner model of knowledge, skills, abilities and achievements that have accrued over years of a person's life (much like a quantified digital learning portfolio). This upper bound is actually being achieved to sell products in the commercial world (using the data collected from customers), but the world of education research has barriers that observe privacy, and ethical and legal constraints that prevent the sharing of datasets among

There has been an emphasis in recent years on personalized learning whereby the learner has some agency in selecting what to learn and the learning environment, thus delivering the right learning activity to the learner at the right time (NASEM, 2018).

research communities. However, steps have been taken towards the upper bound in education (**Rus et al., 2020**).

6.3 .4 .2

INTELLIGENT ADAPTIVE TUTORING SYSTEMS

Intelligent tutoring systems keep a detailed record of students' knowledge, skills and psychological characteristics (called a student model) and use that model to generate adaptive responses to help students learn or stay engaged (**Woolf, 2009; Graesser, Hu and Sottilare, 2018; GIFT, 2020**). These systems have shown promising learning gains compared to conventional learning activities (lectures, reading) presumably because of their interactive nature (**Kulik and Fletcher, 2015**). AI-based assessment in tutoring systems can also rigorously, continuously and stealthily evaluate student progress/levels in learning, and provide timely information for different stakeholders (**Shute and Kim, 2014; Luckin, 2017**).

6.3 .4 .3

INTERACTIONS WITH THE LEARNER IN NATURAL LANGUAGE

Revolutionary advances in computational linguistics (**Jurafsky and Martin, 2008**) have made it possible to analyse natural language and discourse in visual and spoken text in essays and conversation and written text (**Graesser and McNamara, 2012; Yan, Rupp and Foltz, 2020**). There are now intelligent tutoring systems that enable students to have turn-by-turn conversations with computers in natural language that yield learning gains equivalent to trained human tutors in computer-mediated communication (**VanLehn, 2011**). These computer tutors do not perfectly comprehend student contributions but neither do human tutors (**Graesser, Person and Magliano, 1995**). A conversational interaction can prompt students to become more active learners by asking challenging questions, providing hints and other conversational discourse moves.



New technologies promise to track the knowledge, skills and abilities of individual students at a more nuanced level, with recommendations for learning environments that are tailored to their needs.



6.3 .4 .4

GAMES

Educational games increase learning through a more motivational route. Researchers have designed educational games, digital game-based learning (DGBL) in particular, to optimize learning through motivation (Tobias and Fletcher, 2011; Wouters and van Oostendorp, 2017), to assess

learning continuously (Wang, Shute and Moore, 2015), to assess socio-emotional development (Dishon and Kafai, 2020), to cultivate perspective-taking (Irava et al., 2019), and to employ culturally sensitive-differentiated tools (Park and Wen, 2016; Shadiev, Sun and Huang, 2018). Meta-analysis has been conducted and shows mixed success in improving learning but, with further engineering and science, the promise is undeniable (Wouters et al., 2013; Clark, Tanner-Smith and Killingsworth, 2014).

... without safeguards, standards and policies, such student evaluation information could be used as reasons to limit students' choices and opportunities about what to learn, because algorithms predict their low probability of success.

6.3 .5

ENHANCEMENT OF LEARNING EXPERIENCE

There has been an emphasis in recent years on personalized learning whereby the learner has some agency in selecting what to learn and the learning environment, thus delivering the right learning activity to the learner at the right time (**NASEM, 2018**). This is very different from the current, but elusive, model of effective intervention applied uniformly to all students in a classroom (**Lortie-Forgues and Inglis, 2019**). New technologies promise to track the knowledge, skills and abilities of individual students at a more nuanced level, with recommendations for learning environments that are tailored to their needs. This is the vision of intelligent tutoring systems and other adaptive instructional systems that tailor instruction to individual learners (**Woolf, 2009**;

Graesser, Hu and Sottilare, 2018; also critical views, e.g. Selwyn, 2019).

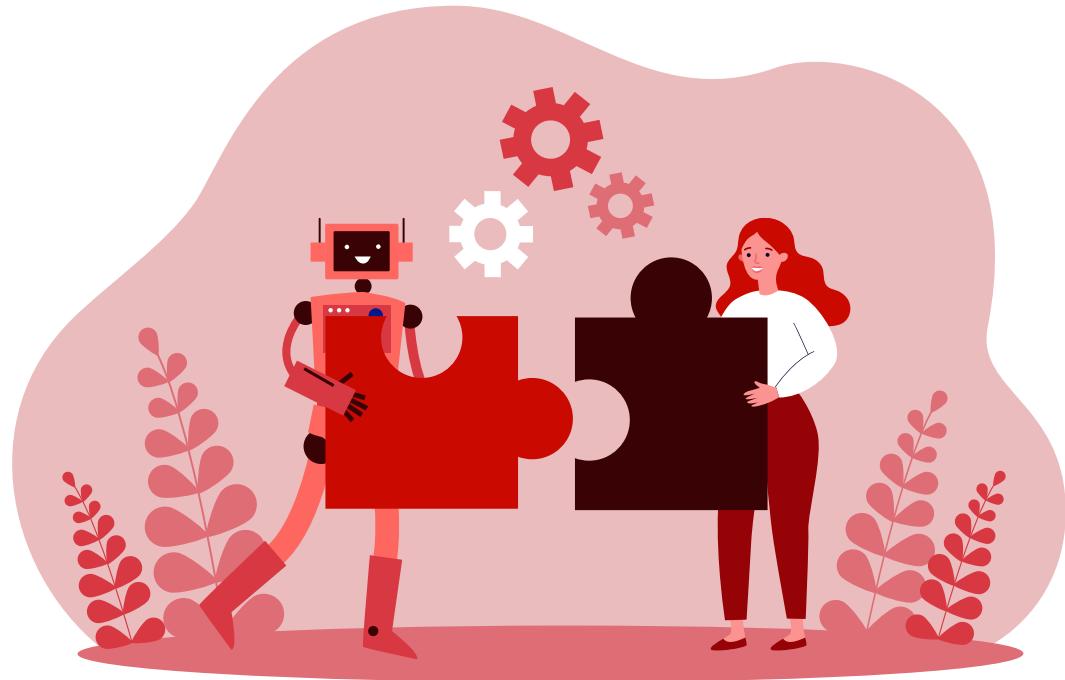
The promise of such EdTech is obvious, but developing standards and safeguards is equally important at the development and research level. For example, what happens once an upper bound of learner data are collected? On the positive side, the data can be mined for patterns that reflect success in learning and motivation. Machine learning techniques, such as multilayered neural networks in deep learning (**LeCun, Bengio and Hinton, 2015**), can automatically identify the patterns that predict learning and engagement gains, including an estimate of how well the patterns generalize from one niche of learning activity to others. On the negative side, without safeguards, standards and policies, such student evaluation information could be used as reasons to limit students' choices and opportunities about what to learn, because algorithms predict their low probability of success. Further, without safeguards, broaching privacy and confidentiality, such



decisions could be made without their knowledge (e.g. Drachsler and Greller, 2016).

The above survey of existing and emerging EdTech reveals an accelerating R&D context that is overwhelming in its diversity,

complexity and promise. But how do stakeholders make sense of all of this when deciding what is best for teaching and learning in educational settings? To address this question, we take a more conceptual approach, examining the literature on how people learn



6.4

How people learn, affordances of EdTech, and tailoring to individuals and groups

Deciding how and when to use EdTech requires an understanding of the different types of learning that may occur in formal and informal learning environments. In turn, EdTech-augmented

learning environments need to be aligned with the goals and types of learning. For example, drill and practice is fine for certain basic mathematical computation operations (implicit pattern



Observational learning may be influenced by many factors such as the individual's perception of themselves relative to those modelling the behaviour, be they teachers, caretakers, authority figures or peers.

learning) in children but not for building mental models of how a nuclear reactor works in adults (mental models with inferences). This is the nexus at which the learning sciences intersect with EdTech to inform decision-making. As we look to the future, research is revealing new affordances of EdTech and how it can be aligned not only to the content being learned but also to individual differences in learners or to groups learning together.

6.4 .1

HOW PEOPLE LEARN

The second edition of *How people learn* (NASEM, 2018) identifies types of learning, noting that multiple types of learning are integrated or orchestrated in acquiring new knowledge, skills or strategies, and are influenced by the learner's context, culture and individual characteristics. The types of learning identified include:

Habit formation and conditioning. Conditional learning is gradual, often unconscious and self-reinforcing. Habits may have positive or negative dispositions and may be deployed automatically, that is, with ease, fluency and relatively little cognitive effort, when environment conditions cue their use.

Observational learning.

Imitation, interpretation, modelling and inference may all be called upon when learning by observation. Observational learning may be influenced by many factors such as the individual's perception of themselves relative to those modelling the behaviour, be they teachers, caretakers, authority figures or peers.

Implicit pattern learning.

Sometimes called 'statistical learning', this involves the learning of regular patterns in a particular environment without actively intending to do so. This kind of learning is akin to observational

How to optimize learning of any specific skill or topic is a central question explored in the learning sciences, and almost always involves a mixture of types of learning to achieve complex goals or expertise in a domain.

learning but is characterized by the unconscious recognition of regularities or patterns in an otherwise irregular context, without conscious attention and reflection being directed to the regularity or pattern by direct instruction.

Perceptual and motor learning. Learning through perception or sensory experiences can be characterized as perceptual or motor learning. Complex physical skills such as learning to play a musical instrument, sport or manipulating a game console are examples where percepts and actions are developed to work in coordinated ways with high levels of sensitivity and specificity required to attain expertise.

Learning of facts. Facts or information can be learned in a single trial or over repeated exposure, incidentally or intentionally (studying, memorization). One might distinguish facts (which have a positive truth value) from data. Facts can be learned from

external sources or generated by elaborating on what one already knows.

Learning by making inferences.

Inference-making captures a wide range of cognitive operations including, but not limited to, reasoning, analysis, synthesis, abduction, evaluation, elaboration, model-making and creativity. It enables generalization and transfer of learning to new contexts and situations.

How to optimize learning of any specific skill or topic is a central question explored in the learning sciences, and almost always involves a mixture of types of learning to achieve complex goals or expertise in a domain. For example, when learning a complex array of facts, the learning sciences point to spaced practice over massed practice and memorization. Learning to play a musical instrument, on the other hand, favours an environment with more perceptual and motor learning practice. Duly selected EdTech can facilitate different



types of learning by intensifying exposure to sensory stimuli, experience and iterations.

An optimal learning context occurs when existing knowledge is able to be compared, contrasted or applied to novel situations, that is, the cognitive process of drawing upon existing knowledge in the ‘long-term store’ (**Atkinson and Shriffin, 1968**). Evidence from research on cognitive load indicates that due to the ephemeral nature and limited capacity of the ‘short-term store’ or ‘working memory’, its overloading with multiple sources, all at once, of visual, auditory and textual information can lead to a state of divided attention and lack of effective learning (**Sweller, 1994; Sweller, Ayres and Kalyuga, 2011; Kalyuga, 2015**). Cognitive capacity can therefore be undercut by cognitive overload caused when sensible instructional design does not take human-processing capacity limitations into consideration. For example, the mere presence of a smartphone (not in use) could diminish cognitive performance

if it is a source of distraction – splitting attention or depleting working memory resources on content not relevant to learning objectives. An extreme case of this is ‘smartphone dependence’, a habitual state of distraction whenever one’s smartphone is present (**Ward et al., 2017**). Thus, from the perspectives of pedagogy and instructional design – EdTech inclusive – planning the dynamics among different levels of cognitive processing is paramount.

6.4 .2

AFFORDANCES OF EDTECH

In any topic or domain, knowledge, skills, strategies and disposition (KSSD) need to be learned, and each is likely to require one or more types of learning activity. Curriculum, instructional designers and teachers have expertise in understanding, developing and delivering instruction to help

Thus, from the perspectives of pedagogy and instructional design – EdTech inclusive – planning the dynamics among different levels of cognitive processing is paramount.

learners build KSSD. EdTech is one of the tools in a toolkit of instructional design. Towards this end, we can analyze technologies from the perspective of their affordances. The second edition of *How people learn* (NASEM, 2018, pp. 165–66) identifies some of the affordances of learning technologies to help guide this alignment between KSSD and EdTech.

Interactivity: the technology systematically responds to the actions of the learner.

Adaptivity: the technology presents information that is contingent on the behaviour, knowledge or characteristics of the learner.

Feedback: the technology gives the learner information about the quality of their performance and how it could improve.

- Choice: the technology gives learners options on what to learn and how to regulate their own learning.

Nonlinear access: the technology allows the learner to select or receive learning activities in an order that deviates from a set order.

Linked representations: the technology provides quick connections between representations for a topic that emphasizes different conceptual viewpoints, media and pedagogical strategies.

Open-ended learner input: the technology allows learners to express themselves through natural language, drawing pictures and other forms of open-ended communication.

Communication with other people: the learner communicates mediated by technology with one or more people or agents.

The combinations of learning that need to complement a particular curriculum or instructional standard require the joint responsibility of learning scientists, curriculum and instructional



The combinations of learning that need to complement a particular curriculum or instructional standard require the joint responsibility of learning scientists, curriculum and instructional designers, and teachers.

designers, and teachers. Almost every complex skill (reading, mathematics, writing) will require a combination of different types of learning at different stages of skill acquisition. Understanding the stage in which the target is learning facts, or forming habits and disposition, or implicitly learning the different patterns, will help decision-makers to choose appropriate EdTech solutions to aid in that learning.

There exist a score of frameworks or theoretical models to support technology integration into teaching, notably:

TPACK, that is, technological, pedagogical and content knowledge on different dimensions and types of knowledge mediated by technology;

SAMR (substitution, augmentation, modification and redefinition), which is a four-level, taxonomy-based technology integration in primary and secondary education;

TIM (technology integration matrix), an EdTech model which is the result of intersecting five levels of technology integration (entry, adoption, adaptation, infusion and transformation) with five types of learning environment (active, collaborative, constructive, authentic and goal-directed);

RAT (replacement, amplification, transformation), which is a theoretical construct on the effect of technology on pedagogy; and

PICRAT, a passive, interactive or creative relationship between student and technology which encompasses the RAT construct (FCIT, 2005; Mishra, Koehler and Zhao, 2007; Hamilton, Rosenberg and Akcaoglu, 2016; Harmes, Welsh and Winkelman, 2016; Kimmons, Graham and West, 2020).

In order to adjust EdTech to diverse types and areas of support need such as for intellectual and/or physical disabilities, it is important to abide by the principles of universal design ...

6.4 .3

EQUITABLE ACCESS TO DIFFERENT LEARNERS

The United Nations (UN) Sustainable Development Goal 4 (SDG 4) aims to ‘ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’ (UN, 2015, p. 14). It presents ‘a new vision’ for education that is ‘comprehensive, holistic, ambitious, aspirational and universal, and inspired by a vision of education that transforms the lives of individuals, communities and societies, leaving no one behind’ (Knox, Wang and Gallagher, 2019, pp. 2–3). Here, we focus on inclusive education for persons with disabilities and some of the assistive technologies that work to achieve this. In order to adjust EdTech to diverse types and areas of support need such as for intellectual and/or physical disabilities, it is important to abide by the principles of universal design, that is, a

common instructional design – for curriculum and pedagogy – that accommodates students with different support needs (Wehmeyer et al., 2012).

EdTech has led the way in providing opportunities for differently abled students to learn (Fichten et al., 2009). It has been used to support individuals with special needs to concentrate on tasks; it has also been used to provide opportunities for these individuals to try simulations, basic drill or practice, communication or explanatory activities, and increase higher-order thinking skills (Edwards, Blackhurst and Koorland, 1995; Yeni and Gecu-Parmaksiz, 2016).

Arkorful and Aibadoo (2015) discuss the advantages of e-learning, including flexibility, improved access, the ability to overcome systemic barriers, and personalization. They also discuss e-learning’s disadvantages, such as the lack of direct social interaction, inefficient explanations compared to traditional methods, and the



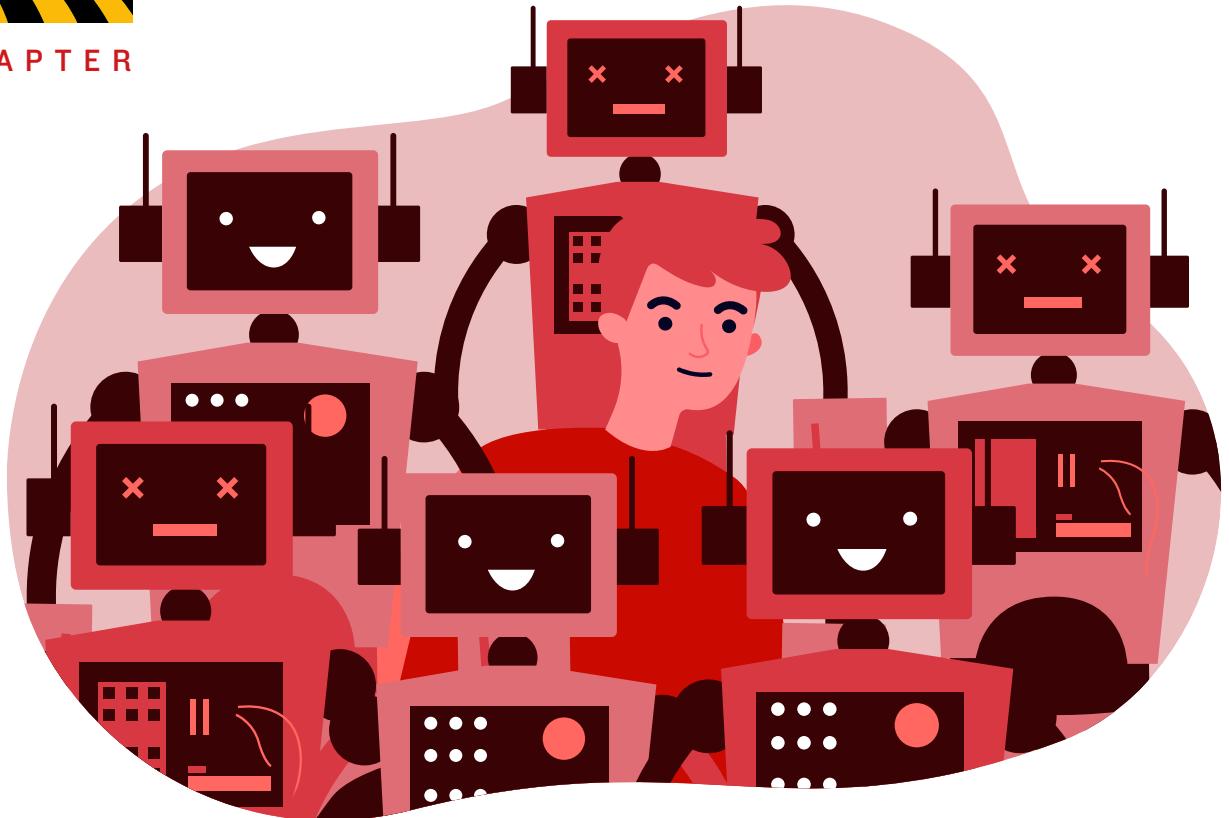
AI in educational development (AIED) provides robust tools for the development of personalized learning for the atypical dimensions of inclusive education ...

requirement of strong self-control and discipline on the part of the student (**Bandalaria, 2018**).

EdTech also comes with several strengths that can aid pedagogical practices in the education of differently abled individuals. For example, AI in educational development (AIED) provides robust tools for the development of personalized learning for the atypical dimensions of inclusive education including students with social anxiety, autism spectrum disorder (ASD) and specific learning difficulties such as dyslexia and dyscalculia (**Vincent-Lancrin and van der Vlies, 2020**). Additionally, emerging development in robotics has allowed the design of AI social robots to provide valuable tools for social and emotional learning in the atypical student population (**Vincent-Lancrin and van der Vlies, 2020**). Data collected from facial recognition (emotion, eye-tracking) and speech recognition

(feedback, emotion, assessment, etc.) are used in training of AI-enabled EdTech to develop a user-oriented approach for creating adaptive learning environments (**Mohammed and Watson, 2019**).

As previously noted (**see section 6.1**), an issue in the AI field is how the cultural and social biases in the data collected and used to train AI-enabled machine learning systems make the system inherently biased towards inequalities already existing in societies from where the data are derived. AIED is heavily influenced by WEIRD samples, with 82 to 95 per cent of all research coming from high-income countries, showing clear global imbalance in datasets used in models and systems (**Mohammed and Watson, 2019**). The ultimate success of AIED will be achieved through an integration of multiple, plural world views and contextualized datasets used to train the AI.



6.5

Critical issues

In the following section, we spotlight current and future priority issues for research, policy and practice in the social and cultural context of EdTech's application in educational systems. We introduce each issue with a literary allusion or a historical figure to draw attention to

different points of view on the interplay of history, culture and technology, as a reminder that human agents need to play the lead role in the drama of how EdTech will unfold in the years to come.





... the existence of a digital divide in education based on societal advantage/disadvantage presents an educational moral imperative to address the problem of access as a right, not a privilege.

6.5 .1

MAHATMA GANDHI AND CONFRONTING THE DIGITAL DIVIDE

Mahatma Gandhi forewarned us of a world sustainably divided into those in necessity and those in abundance, adding a note of hope and admonishment: ‘The world has enough for everyone’s need, but not enough for everyone’s greed’. While we have posited that EdTech is not a panacea for all the ills of education, it has the potential to be the great equalizer, moving the world towards ‘enough’ for everyone’s educational needs. But for this promise to even have a chance, we must address the issue of the digital divide.

Scheerder, van Deursen and van Dijk (2017, p. 1608) define the digital divide ‘as inequalities in access to and use of ICTs, mostly the Internet’. We expand on this definition to broadly include the

broader range of EdTech we have been discussing in this chapter. In education, the digital divide is currently discussed at three levels: (1) access/infrastructure; (2) skills/uses; and (3) mastery/outcome (e.g. Yuen and Park, 2012; Yuen et al., 2016a, 2016b, 2017; Park, 2021a).

While an individual or group may choose to opt out of some or all of our technology-driven cultures, governments should not be able to deny access or infrastructure to some groups as policy. This speaks concretely to the digital divide in education, because access/infrastructure is unevenly distributed, along the lines of the persistent inequities we face within and across societies and countries.

That is, the existence of a digital divide in education based on societal advantage/disadvantage presents an educational moral imperative to address the problem of access as a right, not a privilege (Park, 2021a). One cannot promise ‘separate, but equal’ opportunity when the advantaged have access to all that technology promises, and are pitted against

The lack of technological infrastructure in the form of stable electricity, internet connectivity and bandwidth, and software and hardware results in a widening of the inequality gap in education across nations.

the disadvantaged (defined differently in each society) who only have ‘basic’ education and resources, given that the students must compete economically and flourish independently in a tech-rich, adult society. This is a version of institutional discrimination. An individual may reject technology, but the ‘state’ should provide equitable opportunities to use it.

The lack of technological infrastructure in the form of stable electricity, internet connectivity and bandwidth, and software and hardware results in a widening of the inequality gap in education across nations (**Aduwa-Ogiegbaen and Iyamu, 2005; UNESCO, 2015; Eze, Chinedu-Eze and Bello, 2018**). This is also the case locally, with reports demonstrating the EdTech constraints in low- and middle-income countries (LMICs), where most EdTech infrastructure is concentrated in urban centres (**Delponte et al., 2015**). Surveys have found that only a minority of children have access to ‘learning continuity’ in LMICs in Africa; in Senegal, less than 11 per cent of children

accessed technological tools to continue their studies during the pandemic (**Le Nestour et al., 2020**). A technology infrastructure is therefore a necessary, though not sufficient, condition to take advantage of EdTech innovations as they emerge. That is, it affords opportunity, but does not guarantee its integration (**Fishman and Dede, 2016**).

The good news, to which we have alluded, is that EdTech can be an equalizer in the distribution of educational resources. Paraphrasing an old proverb: give a child a traditional book and they can read one author for about a week. Give a child an ebook and they will have a library of authors to read for a lifetime. That is, the question of priorities within education leans heavily towards investing in infrastructure over traditional print materials. Economically and environmentally, digital is cheaper and cleaner than paper-based materials to distribute and update. With respect to cost and diversity of delivery, EdTech is more portable, reaches remote



With respect to cost and diversity of delivery, EdTech is more portable, reaches remote areas and can be used to reduce the constraints of geography. By accessing remote areas, it can help expand perspectives.

areas and can be used to reduce the constraints of geography. By accessing remote areas, it can help expand perspectives. The rationale is that an enhanced infrastructure affords greater access to better education for all. However, for many, EdTech solutions, such as ebooks, are still neither affordable, nor feasible. Even if they were, what would happen when the ebook malfunctions – where is the technical support? What if there is not ready electricity for charging devices? What happens when system upgrades render earlier hardware obsolete? Investments need to be designed for sustainability and not for simple short-term gratification and impressions.

Economically, several studies corroborate the ‘leapfrog’ effect of EdTech on national growth and development, when adequately planned and financed (e.g. Sepehrdoust, 2018; Adeleye and Eboagu, 2019). In sum, the ethical argument may align with the economic – although EdTech investment is expensive, the state has a moral duty to ensure equal

EdTech access to its citizens, thus providing opportunities for marginalized populations to partake in the digital revolution.

The guiding principle of eliminating the digital divide, however, is only the starting point for a series of challenging questions. Yes, there is a need for governments to invest in EdTech infrastructure and to build robust and efficient technology-driven policies (Kamperman Sanders et al., 2018; Tauson and Stannard, 2018). But how is this accomplished?

For example, there are opportunity cost considerations for countries to invest in expensive EdTech infrastructure. With some LMICs short of basic education, health care, electricity and clean water, the question is not only whether scarce financial resources should be allocated to EdTech setup, but also whether the returns are sufficient to justify the investment. On one hand, there are reports that ICTs/EdTech infrastructure does not always contribute to human capital formation, for example, in some African contexts

To provide some nuance to the arguments above, we view the multiple results not as pointing to inconsistencies, but rather to the underlying difficulty of measuring the impact of ICTs.

(Ngwenyama et al., 2006; Ejemeyovwi, Osabuohien and Osabohien, 2018). On the other hand, there is sizable evidence that social media and big data analytics are strongly linked to public education, for example, in health care (Kamel Boulos and Wheeler, 2007; Moorhead et al., 2013; Murdoch and Detsky, 2013; Raghupathi and Raghupathi, 2014).

To provide some nuance to the arguments above, we view the multiple results not as pointing to inconsistencies, but rather to the underlying difficulty of measuring the impact of ICTs. It has been argued that the effectiveness of EdTech on development might be based on specific parameters that account for categorization (e.g. country, economic capabilities). For instance, Sepehrdoust (2018) suggests the real impact of technology can be determined by comparing countries with comparable socio-economic indicators on a specified time lag. Differences across countries would provide a vivid and accurate diagnosis of the impact of EdTech and thus inform government policies. While we may debate the

means of addressing the digital divide, it is difficult to imagine a future where technology does not figure prominently in a country or region and therefore, a time when EdTech is not a necessary element of a quality education system. Consequently, bridging the digital divide is imperative.

6.5 .2

ZHUANG TZU ON THE VIRTUAL AND THE REAL

A special affordance of technology has been to bridge the gap between the real (in-person) and the virtual or remote, blurring the boundaries between objectivity and subjectivity, calling to mind this quote: ‘Once upon a time, I, Chuang Tzu, dreamt that I was a butterfly, flitting around and enjoying myself. I had no idea I was Chuang Tzu. Then suddenly I woke up and was Chuang Tzu again. But I could not tell, had I been Chuang Tzu dreaming I was a butterfly or a butterfly dreaming



I was now Chuang Tzu' (**Zhuangzi and Palmer, 2006**).

The COVID-19 pandemic has transformed the world at times into a dire and surreal place. Traditional classroom learning has been forced to move to the virtual, facilitated by ICTs. Countries have adapted to the crisis and strive to provide learning continuity to millions of students. In Nepal, for example, online learning platforms have allowed students and teachers to remain connected with opportunities for teachers to provide moral and emotional support to students (**Surkhali and Garbuja, 2020**).

...there is accelerated commercialization of new EdTech platforms alongside a lack of pedagogical/curricular rigour and continuity and a lack of ethnic and culture-based adjustments.

Despite the necessity of online learning platforms, there has been a backlash from diverse groups of teachers, students and parents to virtual learning. For example, the massive open book online examinations administered by Delhi University in India resulted in failure due to the existing digital divide, lack of textbooks for all students, and no prior teaching or training on the new format (**Iftikhar, 2020; Pande and**

Marathe, 2020; Scroll Staff, 2020; TeamCareers360, 2020). As discussed in the previous section, the COVID-19 pandemic has shone a glaring light on the digital divide that exists between and within countries. Additionally, there is accelerated commercialization of new EdTech platforms alongside a lack of pedagogical/curricular rigour and continuity and a lack of ethnic and culture-based adjustments coupled with the rapid switch to virtual learning (**Zhang, Ordóñez de Pablo and Xu, 2014; Williamson and Hogan, 2020**).

Yet opportunities lie in every crisis. Distance learning is characterized by an information delivery mechanism whereby the educator and learner are separated in both time and space (**Billings, 2007**). Virtual learning thus has proven to be the only readily available avenue during the crisis through which to connect people and ideas across time and space, bridging local/community learning and engagement. These virtual learning models could even be adapted to place-based learning contexts, in which teachers and students learn

There is an opportunity to promote the best of both worlds – blended learning which combines traditional classroom learning methods with online learning modalities.

and connect in situ to surrounding communities (Sobel, 2004).

It should not have required a crisis to recognize the need to address the above challenges through creative and sustainable technology-guided policy decisions, which take into account the social and cultural contexts of learning. There is an opportunity to promote the best of both worlds – blended learning which combines traditional classroom learning methods with online learning modalities (Green and Whitburn, 2016) allowing knowledge from all over the world to be accessed by place-based, real people in experiential ways. Evidence from meta-analysis shows a larger effect size of learning when ‘a blended rather than a purely online condition was compared with face-to-face instruction; when the online pedagogy was expository or collaborative rather than independent in nature; and when the curricular materials and instruction varied between the online and face-to-face conditions’ (Means et al., 2013, pp. 35–36).

However, we should not ignore critiques of these changes and the possibility that the current forms of online learning will exacerbate the negative facets of social distancing, not just physically, but emotionally. In medical education, for example, the task of identifying different types of cognitive overload (see subsection 6.4.1) among learners, namely, reduced performance, non-verbal cues, verbal utterances and interpersonal interactions (e.g. lack of responsiveness) are far more challenging during the pandemic (Rajput, 2020; Sewell, Santhosh and O’Sullivan, 2020). Our modern and emerging technologies are requiring that we ask ourselves deep questions about what it is we value in our human learning experiences and environment, for example, the link between EdTech and cultural values (Yuen et al., 2017; Irava et al., 2019), versus what might be learned or experienced via the remote, virtual or simulated worlds we may inhabit in between.



Disruption of the definition and role of teachers, while playing out differently across the world, has been underway for years.

6.5 .3

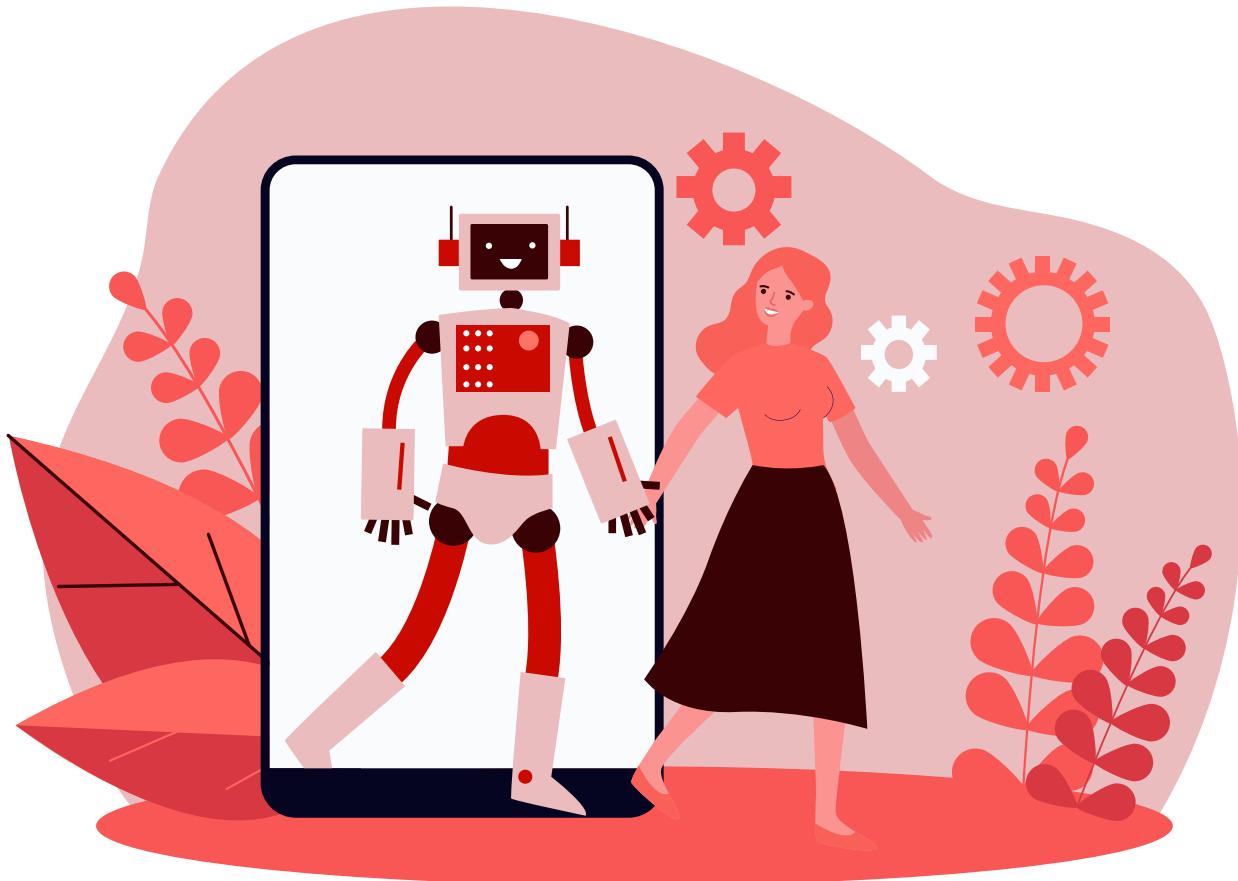
JOHN HENRY AND THE ROLE OF THE TEACHER IN THE TWENTY-FIRST CENTURY

The American folktale of John Henry tells of a powerful nineteenth-century railroad worker whose livelihood is challenged by the invention of a riveting machine. John Henry challenges the machine to a head-to-head contest and wins, but the strain results in his immediate death from a burst heart (**see also Fishman and Dede, 2016 for another application of this tale**).

The teacher figure is archetypal in human history, although the definition and characteristics of a teacher vary across cultures and countries. There is no reason to doubt the continued role of teachers in education, but, heeding the warning of the John

Henry folktale, battling EdTech at what it does best is not a winning strategy. Disruption of the definition and role of teachers, while playing out differently across the world, has been underway for years. The quality of the learning that children experience will be highly dependent on how teachers approach their role, and increasingly how they see that role vis à vis EdTech. Given that technology integration is not prioritized in most teacher preparation programmes, increasing pre-service teachers' levels of readiness to the use of EdTech is necessary (**Cuhadar, 2018**).

Most individuals consider the increasing role of EdTech in the teaching-learning process as a significant upgrade to the existing traditional face-to-face standard (**Mikre, 2011**). Although teaching and learning have traditionally been considered activities that predominantly occur within the four walls of a classroom, a significant shift in digital technology seems to have broken this confinement and transformed teaching into a



ubiquitous exercise. Nevertheless, evidence from large-scale, meta-analytical comparisons between technology-mediated instruction and teachers' pedagogical interventions (e.g. providing feedback, teacher-student relationships, metacognitive strategies and direct instruction)

indicate an effect size in learning that is about twice as large for teachers' quality interventions (**Hattie, 2009**). The effect size of fully online learning is similar to that of face-to-face learning, while blended instructions have a greater effect size than a solely face-to-face mode (**Means et al., 2013**).



EdTech's role need not be to replace teachers but to inform their professional judgement and enhance their pedagogical interventions.

This is not to deny the ubiquity and importance of EdTech but to underscore that EdTech has the highest effect on actual learning when:

- there is a diversity of teaching strategies bringing exciting curricula based on real-world problems into the classroom;
- there is pre-training in the use of computers as a teaching and learning tool (teacher learning inclusive);
- there are multiple opportunities for learning (e.g. deliberative practice, increasing time on task) in addition to scaffolds and tools to enhance learning;
- the student, not the teacher, is in 'control' of learning through feedback, reflection and revision;
- peer learning is optimized (e.g. grouping, cooperative learning structure); and
- feedback is optimized (upon

challenging tasks) (**Bransford, Brown and Cocking, 2000, p. 207; Hattie, 2009, p. 221; Means et al., 2013**). EdTech's role need not be to replace teachers but to inform their professional judgement and enhance their pedagogical interventions: 'Technology can extend the reach of great teaching, recognising that value is less and less created vertically, through command and control, but increasingly horizontally, by whom we connect and work with' (**Schleicher, 2018, p. 263**). This is why in the fast-changing environment of EdTech, teachers' (re)training is paramount.

According to Bashir et al. (2018), there is a need to create a platform for school teachers to be intensively trained in technologies to sustain effective use of EdTech in teaching. Turning teachers into 'technology integrationists' requires meeting standards that increase the inculcation of such processes into actual teaching and learning. As part of the lessons drawn from their study on developing countries (Nigeria and Senegal), McAleavy et al.

EdTech has the potential to transform the traditional role of the instructor because, with proper EdTech applications, instead of being the main source of information and power, the teacher becomes a facilitator in the learning process.

(2018) emphasize that the use of technology for teacher training needs to be considered for effective professional development.

Another important aspect of the relationship between teachers and EdTech is power dynamics. Barak (2006) argues that EdTech has the potential to transform the traditional role of the instructor because, with proper EdTech applications, instead of being the main source of information and power, the teacher becomes a facilitator in the learning process. With greater access to information and media of exchange across geographic space, there are possibilities for the democratization of knowledge. An illustration of this is a case study in Colombia in the form of a community-based course called Koru involving three grassroots initiatives. Through the video conferencing platform Zoom, a virtual space was established whereby participants from Indigenous, Afro and Campesino communities carried out a virtual discussion around Colombian ecotourism. The possibility

for the participants to be the protagonists of the discussion, talking and sharing with people ethnically, culturally, ontologically and geographically distant from one another was a strength of the course, as shared in later focus groups (Macintyre et al., 2020).

It is known that online communication may reduce the transactional distance between student and instructor (Attardi, Barbeau and Rogers, 2018; Stone and Barry, 2019), hence, it should bridge such a gap in order to achieve the instructional goal. A strong offline teacher–student relationship might also result in students feeling more comfortable while engaging with online communication platforms (Griffiths and Graham, 2009; Rose, 2009).

There are many conservative forces and social mores that might seek to preserve the classic role of teachers, and therefore not adapt learning environments to be inclusive of EdTech innovations. For example, the traditional teaching method – where teachers teach and students listen – is



...there is an opportunity for EdTech to act as a bridge between students and teachers, whereby teachers facilitate the exchange of information and experience between participants who use the knowledge as it suits their context and needs.

strongly rooted in African teaching and learning practice (**Akano, Ugwu and Ikuanusi, 2016**). Many African teachers are ‘digital immigrants’ and they wish to maintain the status quo in regard to EdTech due to their fear of unwarranted conditions that changing teaching methods might bring (**Ghavifekr and Rosdy, 2015**). Teacher training can help them to overcome such fears and transform their practice. This is again not an argument against the value of teachers, but rather a call to consider the consequences of different approaches to address the problem of technologies’ disruption in existing economic and social systems.

In summary, there is an opportunity for EdTech to act as a bridge between students and teachers, whereby teachers facilitate the exchange of information and experience between participants who use the knowledge as it suits their context and needs. A challenge to this changing role of the teacher is the necessity (and the consequent challenges) to train teaching professionals in new technologies.

A threat could also emerge from inbuilt cultural norms in which traditional teacher–student hierarchical relationships are difficult to change.

6.5 .4

FRANKENSTEIN AND THE ETHICS OF EDTECH

Mary Shelley’s (1823) novel *Frankenstein or the modern Prometheus* is a time-honoured narrative about individuals innovating oblivious of the negative consequences in the realm of morality. The ‘modern Prometheus’ in the full title refers to the Greek myth of Prometheus who steals fire, a divine property and prerogative, to give to humanity, only to be endlessly punished for transgressing the boundaries between gods and humans. Most cultures have variations on this theme, for example, in Slavic mythology

The ability to identify patterns in student learning through analysis of ‘learning process data’ promises adaptive learning environments tailored to individuals.

there is Kryshen (god-giver of fire) and in the Chinese tradition, we find Shennong, the Divine Peasant (the origin of agriculture and medicine).

There are currently multiple entities amidst the swirl of technological development, reflecting upon and attempting to come to terms with ethical considerations to unbridled progress (**Aiken and Epstein, 2000; Smith, 2018; Selwyn, 2019**). Beyond individual scholars and writers, there are organized groups developing standards for privacy, security and confidentiality. Often policy, industry, citizens and academics comprise these groups. Whether and how other public policies, governments, or businesses heed or comply with recommendations or standards is a separate issue.

The dual-edged sword of unbridled technological progress is exemplified by the emergence of big data analytics, where the systematic analysis of large datasets helps extract patterns, information and trends in a range

of student learning behaviour and interactions. In education, these analytics can result in a reduction in administrative work through collection, analysis and interpretation of data. The ability to identify patterns in student learning through analysis of ‘learning process data’ promises adaptive learning environments tailored to individuals. Big data can thus lead to enhanced pedagogical practices through learning analytics – gauging students’ engagement in learning – and in crafting future educational policies (**Picciano, 2012; Ellis, 2013; Regan and Jesse, 2019; Kuromiya, Majumdar and Ogata, 2020**).

Selwyn (2019), however, discusses a range of ethical issues that challenge these potential positive outcomes of learning analytics including: reduced understanding of ‘education’ to those data points we can collect; ignoring the broader social contexts of education, such as nuances of contextual interaction and language; reducing teacher and student capacity for decision-making, by making decisions



Ethical issues of EdTech are likely to continue surfacing in the future as we conduct research on potential risks resulting from people being exposed to technology from birth to death.

for them; using the data as a means of surveillance to monitor and control teacher and student behaviour; increasing the ‘high stakes’ evaluation of performance; and the risk of continuing to reproduce inequalities in disadvantaged groups, thus primarily serving the needs of the institution over those of the individual.

These issues raised with respect to data analytics are common across multiple types of EdTech, for example, privacy risks for children including issues of choice, consent and transparency (**Davenport and Bean, 2018**); denying choice to users to remain anonymous or obscure in the face of increased surveillance and tracking; and increasing the opportunity to employ discriminatory practices of datafication on marginalized populations (**Macgilchrist, 2018**). There is a perpetual risk stemming from the tracking and collection of student data required and used in data modelling and developing machine learning algorithms. These records are a part of the entirety of students’

careers and potentially can be misused to replicate existing social discrimination or create new discriminatory variables, for example, profiling and discrimination based on race approximation and accentuation of social stratification (**Regan and Jesse, 2019**).

Ethical issues of EdTech are likely to continue surfacing in the future as we conduct research on potential risks resulting from people being exposed to technology from birth to death (**Radich, 2013**). This brings with it a multitude of concerns about the well-being of young children, including addiction, online risk-taking behaviour, cyberbullying, health concerns, including a greater risk of obesity, sleep disorders, bad posture, plagiarism and mental health problems (**O’Keeffe and Clarke-Pearson, 2011; Lau, Yuen and Park, 2013; Richards, Caldwell and Go, 2015; Woods and Scott, 2016**). There are guidelines for the proper use of technology for young children, though they rest on uncertain empirical foundations. More

... educational courses (similar to mandatory courses on sex education and the health risks of drinking) could be created to teach appropriate use of EdTech that protects children against abuse and minimizes risk.

research is necessary to understand and communicate risk factors, balanced against the promise of the ethical use of EdTech to support learning. With such evidence, educational courses (similar to mandatory courses on sex education and the health risks of drinking) could be created to teach appropriate use of EdTech that protects children against abuse and minimizes risk.

Cultural and group differences also need to be considered in ethical inquiry (Lau, Yuen and Park, 2013; Yuen et al., 2016b). For example, critics of EdTech have pointed out that the increasingly personalized and often individualistic forms of learning that the digital revolution promotes is contrary to the philosophy of education derived from the collectivist nature of cultural identity (Gibbons, 1973; Smeyers and Depaepe, 2007). Alternative development paradigms have been developed as a response to what could be called a digitalized, mechanistic worldview of EdTech.

This raises the even broader

issue of the aims of education across the world. The UNESCO (2015) *Rethinking Education* report, for example, emphasizes 'acknowledging the diversity of worldviews in a plural world' (p. 29), noting the concept of *sumak kawsay* (*buen vivir* in Spanish; good living in English), which is rooted in the worldview of the Quechua peoples of the Andes in Ecuador. In educational terms, focusing on the human–nature interconnectedness of *buen vivir* allows us to question and critique excesses in specific aims of education systems, for example, aims solely or predominantly directed towards providing the skills and dispositions necessary to get a job, increase salaries and/or enhance status based on a human capital approach to development (Brown and McCowan, 2018). With humanity teetering on the edge of irreversible climate change, the question of our time is how we can lean towards a more sustainable future (Wals, 2007). Although education plays a central role in this question, as demonstrated by its inclusion in SDG 4, exactly what education



is needed is by no means clear or agreed upon. The current dominant trend, brought about by the digital revolution, is to assume that enhanced digital skills are needed to participate fully in society. Perhaps the question needs to be reversed: what kinds of societies are sustainable and valued, and how can EdTech be entrained to help develop the knowledge, skills and dispositions in our children so that they may make sound choices in actualizing these kinds of societies?

6.5 .5

... the increasingly personalized and often individualistic forms of learning that the digital revolution promotes is contrary to the philosophy of education derived from the collectivist nature of cultural identity

GABRIEL GARCÍA MÁRQUEZ AND WHO OWNS THE FUTURE OF EDTECH

Gabriel García Márquez (2003), in Love in the time of cholera, says ‘Wisdom comes to us when it can no longer do any good’. This sentiment points to the elusiveness of authentic knowledge that leads

to wisdom, but also perhaps to the simpler notion that we often learn our lessons only after we have allowed preventable mistakes to occur. The future of EdTech and how it will impact our educational systems is not yet known, and yet it sometimes seems as if it has its own invisible momentum, out of the control or regulation of collective human action, much less human wisdom. The scale of its impact on student experience and life is an open-ended question that will depend, on the one hand, on the rate of both societal and EdTech development and, on the other hand, how and to what ends that technology is applied. Will it foster effective and lasting knowledge in students, and support teachers’ mastery in helping students build that knowledge and the wisdom to use it productively for personal and societal aims (see subsection 6.5.3) (Fishman and Dede, 2016)? Or will it only benefit specific stakeholders, leaving others frustrated, or simply left out? Therefore, one critical question is: who is in control?

For example, education systems

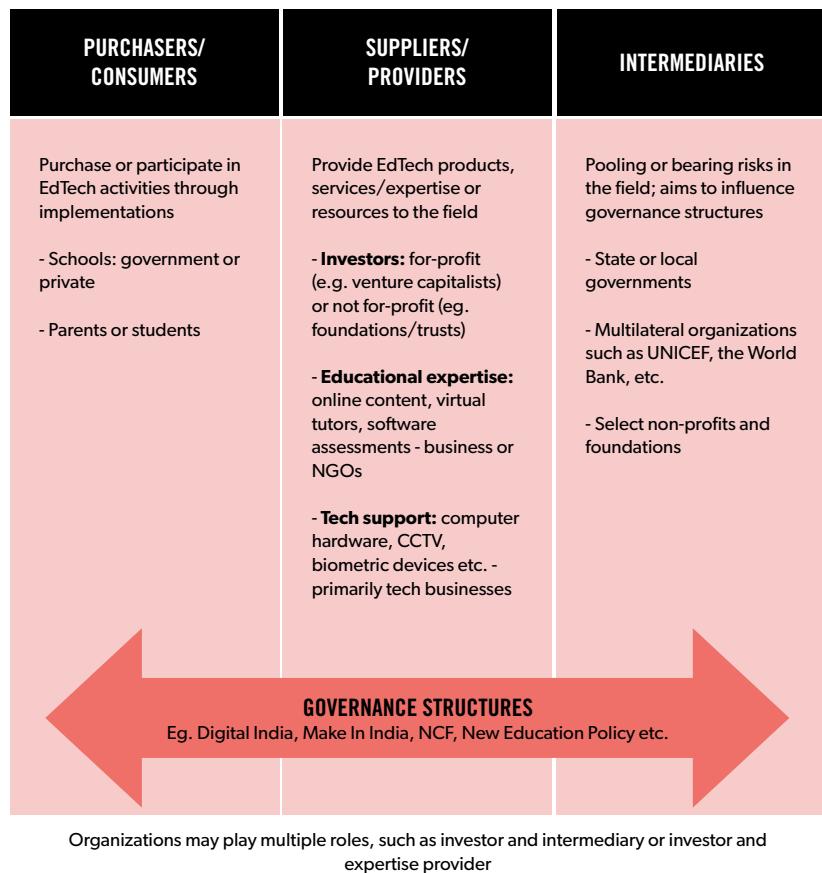


Figure 1. Typology of stakeholders in EdTech. Source: Miglani and Burch (2019, p. 38).

may be the recipients of EdTech solutions, but it is not always clear who is in control of the process and whose interests are being served. There are multiple stakeholders who influence and impact the access, diffusion

and application of EdTech in education. Who are the relevant stakeholders and how are EdTech-related decisions made? **Figure 1** provides a simple, three-cluster typology of stakeholders in EdTech, while the text underneath



Open-source hubs (e.g. GitHub), publicly funded research and capitalized businesses are engaged in a tantalizing dance of intellectual property, human capital and code/tech tool production.

illustrate the complexity of human networks that interact, coordinate and hopefully harmonize their activities in support of learning. The road to wisdom may run along the bidirectional arrow at the bottom of the figure, the governance structures that shape, regulate and sometimes control the unbridled development and dissemination of EdTech. These structures are not always or only the work of governments, but also form within technical communities themselves in and outside the EdTech world. Technical or interested communities may be composed of researchers, developers, policy-makers or citizens in academia, government, education, industry, parents, students or advocate groups (e.g. Bakul, 2016). In a sense, everyone has a stake in these issues, and rationale input into decisions about EdTech might sensibly take into account the varied perspectives of these stakeholders.

We would expect that research is a reliable source of information to inform human decision-makers

in reasoning and forming sensible standards and policies, not only via scholarly publications, but also by providing more transparency to the public in accessing the technologies, program codes and the data sources that drive them. One interesting development in the EdTech world is the interplay of proprietary versus open source codes and content in the EdTech universe. While some of the largest players may keep some intellectual properties proprietary, much of the code is adapted or reproduced in variations in open source repositories, with industry and public entrepreneurs sharing bits and bytes significantly. Large tech enterprises maintain their market position by combining speed in bringing innovations to the market (products or services) in-house, as well as fostering and buying up innovation from without.

Open-source hubs (e.g. GitHub), publicly funded research and capitalized businesses are engaged in a tantalizing dance of intellectual property, human capital and code/tech tool

The LearnSphere project also serves as a hub to link communities of educational researchers; it provides a repository for researchers to store their data and offers an open analytic method library and workflow authoring environment for researchers to build models and run them across datasets.

production. While it is often unclear whether the capabilities and solutions being generated align with the actual problems of education, the potential of applying these innovations in education is beyond doubt. Further, that these capabilities could be directed towards profit, social control or maintaining the status quo of extant institutions and power structures is equally beyond doubt.

For example, LearnSphere is a multi-university initiative sponsored by the US National Science Foundation *to create a community software infrastructure that supports sharing, analysis and collaboration across a wide variety of educational data, in an effort to support researchers as they improve their understanding of human learning. It also helps course developers and instructors improve teaching and learning through data-driven course redesign. The goal is to transform learning science and engineering through a large, distributed*

data infrastructure and develop the capacity for course developers, instructors and learning engineers to make use of (LearnSphere, 2020).

The LearnSphere project also serves as a hub to link communities of educational researchers; it provides a repository for researchers to store their data and offers an open analytic method library and workflow-authoring environment for researchers to build models and run them across datasets.

A kind of EdTech ‘arms race’ is being waged between public and proprietary forces. But unlike medicine where expensive developmental, specialized technical processes, and means of production and distribution make it prohibitive to think of locally grown or craft competitors, education is a relatively cheap and easy service industry for creative dabblers, at least with respect to software development and distribution. A prime example of the reality of strange public/private bedfellows is the Generalized



The criticism that access to EdTech is being restricted by the commercial sector or government needs to account for this unprecedented movement to public sharing and transparency.

Intelligent Framework for Tutoring (**GIFT**, 2020). As described on its website:

'GIFT is an empirically-based, service-oriented framework of tools, methods and standards to make it easier to author computer-based tutoring systems (CBTS), manage instruction and assess the effect of CBTS, components and methodologies. GIFT is being developed under the Adaptive Tutoring Research Science & Technology project at the Learning in Intelligent Tutoring Environments (LITE) Laboratory, part of the U.S. Army Research Laboratory – Human Research and Engineering Directorate (ARL-HRED) ...'

While GIFT is being developed to facilitate the use of CBTS by the US Army, the intent is to collaboratively develop GIFT and have it function as a ‘nexus’ for CBTS research being conducted within government, industry and academia.

Sharing technological innovations is as much the rule as the exception around the world.

The criticism that access to EdTech is being restricted by the commercial sector or government needs to account for this unprecedented movement to public sharing and transparency. Also, criticism about whether the technologies themselves are too narrowly defined and focused can be challenged in the face of the reach of R&D into every crevice of learning science and human capital development. Much more relevant may be concerns regarding who has the skills to engineer and apply the technologies; towards what ends; and in service of whom (i.e. clientele/stakeholders).

The answers to these questions require the wisdom mentioned in the quote above, but as García Márquez warns us, such wisdom is elusive, suggesting that posing the right questions can be as informative as the answers themselves, and the quest to find such answers even more so.



6.6

Closing thoughts: harambee – the spirit of pulling together

Technology continues to be a driving force that transforms our society and human interactions with the world. Multiple new technological advances are on the brink of maturity – machine learning, large data analytics, virtual reality, natural language and speech technologies, and social robotics to name just a few – and their transformative impact on education is nearly upon us. Such a positive transformation, however, cannot be reified without a spirit of collaboration and a ‘pulling together’ (*harambee* in

Swahili) among all stakeholders of education and EdTech. If there is an aspect of the methodology of this chapter we would like to underscore, it could well be summarized as *harambee*.

Assessment of the present and near future in EdTech ultimately rests on the question of the nature and aims of education, yet we also see that education as human capital, and as an instrument for emancipation and human flourishing, is inextricably mediated by technology.



Through thoughtful and humane policies and rigorous science – and *harambee* – we can hope that technology will continue to contribute to human flourishing.

Economic prosperity and gainful occupation are ends sought by governments, commercial enterprises and individuals alike, and education policies working towards this end continue. But to the extent that this is deemed a central aim is an entirely different issue; we might question whether it remains fair and just to continue to educate our children solely in preparation for a future workplace, only to ask them to compete for jobs with the very machines that taught them. In this light, the concept of flourishing and well-being as allied aims seems more promising, lest our children grow only to end up with their hearts burst like John Henry.

We conclude on an optimistic versus a cautionary note. Clearly, the lens one views EdTech through is the filter through which results are to be interpreted. Most research on EdTech is conducted by researchers who accept the premise that technological solutions are appropriate for a given context and problem, and therefore they evaluate its effectiveness in comparison to

some other technology-infused solutions. On the whole, EdTech is designed, developed and implemented by diverse, imaginative, educated, well-intentioned humans who wish to foster human development and address related problems and needs. Successes, failures and unintended consequences arise, and these are all part of the human-learning process. Certainly, we have met many technologists who seem to find it easier to teach machines how to learn than humans, but that has not led them or any of us to give up trying to lead our children down a path towards imagining and creating a world that is better than the one we have bestowed upon them.

Through thoughtful and humane policies and rigorous science – and *harambee* – we can hope that technology will continue to contribute to human flourishing.

This chapter examines the topic of EdTech, broadly defined as any technology applied in an educational context or as a solution to an educational problem. While there is a strong

focus on ICTs and software learning programs, there are also discussions of multiple traditional and emerging technologies that are likely to have a significant impact on education. We discuss both the promise and risks associated with the introduction of new technologies into existing educational ecosystems

6.6 .1

KEY MESSAGES AND FINDINGS

- *Human information production and dissemination over the internet continues unabated*, though evaluating credibility (misinformation) has emerged as a new challenge.

- *Diversity and complexity of the technologies* that can be applied to educational problems continue to grow.

- *Traditional learning software is now more tailored and personalized and powered*

by AI, machine learning and natural language processing (which enables speech perception and production), but language diversity remains a future issue for worldwide use.

- *Robotics and biometric sensors* are being developed as an extension of the human body, learners' affective experience and intersubjective social relations.

- *The digital divide continues to affect education systems* across countries and social strata and clusters within countries.

- *There is a mixture of private/commercial suppliers and public investments in R&D*, as well as public sharing of innovations, especially with respect to programming and coding.

- *Much of the development of emerging EdTech is being produced in WEIRD higher education institutions* and commercial centres, and consequently there is a constant need for research and teacher



training in how to adapt and align to specific educational contexts across nations, regions and cultures.

- *EdTech R&D solutions may be especially well suited for achieving inclusive education for differently abled populations*, though the risk of over-promising the effectiveness of these technologies to consumers, when unregulated, remains a threat.

- *Video-conference platforms are now mainstream technologies for larger and larger segments of society* and can be considered an alternative or supplementary mode of educational delivery to in-person classrooms.

6.6 .2

IMPLICATIONS

Ethical and policy issues of privacy, confidentiality and ownership of personal information, and misuse of

technology that places children, learners and caretakers at risk, are major issues facing educational policy-makers and administrators (see **WG2-ch8**).

The low to moderate effect size in learning through EdTech-mediated interventions calls for continuous assessment and monitoring.

The role of the teacher as the delivery system of knowledge faces significant challenges in the face of technological alternatives, and new roles for teachers must be defined, with appropriate professional development, to avoid significant disruption in the profession.

As EdTech products and solutions are typically designed for use by a specific population, in one cultural context, research in understanding how those technologies are effectively deployed, adapted, aligned or redesigned when introduced into other cultures and contexts is a critical, ongoing research need.

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C H A P T E R

7

Contexts of educational neuroscience

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Educational neuroscience (EN) is a complex research field with a bidirectional relationship between neuroscience and education. The chapter examines the social, cultural, political, ideological and conceptual contexts of EN. One conceptual context for (educational) neuroscience is self-understanding of neuroscience, as a frame for research agendas and dissemination, including a model of explanation (reductionism versus holism) and a model of learning and the learner. When the aim of education is human flourishing, it is important to understand learners in their psychosocial, socio-economic and sociocultural contexts with the goal of holistic well-being. These contexts shape both the research field itself and its direct or indirect uses in/as educational practices. The chapter explores the challenges for EN, including those relating to complexity of learning and of translation to the classroom, research and inclusion, and its ethical implications.

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7.1

Introduction

The overall aim of this chapter is to examine the broad contexts of educational neuroscience (EN) in its relationships with formal educational institutions. Within EN, context is often viewed

narrowly: for example, how the classroom environment, teaching and pedagogy impacts the individual student's brain structure and function as they learn in a classroom, or how socio-economic



The broad contexts include exploring grounding concepts that shape EN as a field, including models of explanation and concepts around learning and the learner.

status (SES) or poverty impacts learning processes. In contrast, this chapter examines a broader meaning, namely, the social, cultural, political, ideological and conceptual contexts of EN as a research practice in its relation to education. Our aim in examining these broad contexts is not merely to describe them, but to critically examine them in the context of human flourishing (**WG1-ch1, ch2**). In particular, discussions of flourishing bring to the foreground issues of inequality and oppression, which include the intersections of inequality along gender, racial, socio-economic, religious, and cultural dimensions (**WG2-ch4**).

Our focus on the broad context of EN leads us to address a cluster of contextual issues. The broad contexts include exploring

grounding concepts that shape EN as a field, including models of explanation and concepts around learning and the learner. We also examine societal contexts for EN, including political/economic factors, as well as social and cultural dimensions. We also have included what we call ‘challenges’ – including those around the complexity of learning and how research findings from the lab translate to classroom practices. Other sorts of challenges centre around research and validity, as well as inclusion and ethics. These challenges situate what sorts of EN research are often encouraged and funded by policy-makers as well as how. Our underlying question is: how do these contexts shape EN’s support of an educational vision of flourishing?



CHAPTER



7.2

Educational neuroscience

EN is a complex research field with a bidirectional relationship between neuroscience and education. Although we use the term ‘educational neuroscience’, we recognize other ways of naming this field, including

mind, brain and education (MBE) and neuroeducation (Knox, 2016). Published papers in EN, a rapidly growing research field, have increased exponentially over recent decades (Feiler and Stabio, 2018). Broadly speaking,



EN often has a systems-level understanding of learning, adopting an integrated view that ‘contextualises learning across multiple dimensions, encompassing well-being, social cognition, affective processing, nutritional factors, genetic factors, sleep, and exercise’

EN researches the brain to understand mechanisms of learning – including research into the interplay between the brain and the learning environment – to improve learning outcomes and experiences by informing teaching and learning practices (Antonenko, 2019; Thomas and Ansari, 2020). EN often has a systems-level understanding of learning, adopting an integrated view that ‘contextualises learning across multiple dimensions, encompassing well-being, social cognition, affective processing, nutritional factors, genetic factors, sleep, and exercise’ (Seghier, Fahim and Habak, 2019, pp. 2–3). Understanding learning mechanisms serves multiple educational purposes, including improving teaching (Schwartz et al., 2019; see also WG2-ch10), understanding teachers’ beliefs and expectations (Hook and Farah, 2013), making learning more enjoyable and promoting more positive interactions among students (Howard-Jones, 2014). EN addresses questions such as how the body’s physiology influences the learning brain (see WG3-ch2); how the

brain learns to read and write and acquire literacy (WG3-ch5); how broader learning environments influence the learning brain (WG3-ch2, ch7); and how studying individual differences can inform and update curricula and pedagogical choices (WG2-ch8; WG3-ch5), assessment (WG2-ch9; WG3-ch5) and teaching practices (WG2-ch10; WG3-ch5, ch6).

As a research field, EN has been described as a ‘syntheses of theories, methods, and techniques of neurosciences, as applied to and informed by educational research and practice’ (Patten and Campbell, 2011, p. 1). With an emphasis on cognitive and developmental neuroscience, EN is comprised of two distinct clusters of disciplines: neurosciences (neurochemistry, molecular biology, electrophysiology, neuroanatomy, neurophysiology, networks) and educational studies (pedagogical studies, learning theories, educational psychology, cognitive psychology, educational sociology, organizational studies). The intersections create internal tensions within EN: the

SES is a broad-spectrum designation that provides a ‘pervasive context throughout one’s life’, affecting not only physical health and well-being but also cognition and agency.

neurosciences tend to embrace a narrower ‘neuromolecular style of thought’ (**Rose and Abi-Rached, 2013, p. 41**), while educational studies tend to embrace broader, more normative styles of thought (**Biesta, 2010**). As things stand, ‘synthesis’ remains elusive in the EN field, which continues to manifest significant tensions and disagreements over fundamental concepts, approaches and evidence (**Flobakk, 2015**). Dynamics around answers to basic questions, and views of integration, are continuing complexities for EN and its relationship to education. Whereas the neuroscience cluster is often couched in terms of empirical science of data, observation and theory, the educational cluster is more typically given in normative language, such as appropriateness, desirability and ethical visions (**Biesta, 2010, pp. 47–48**). This means that education’s markers are often couched in more holistic behavioural metrics, whereas neuroscience’s markers are more typically given in empirically generated measurements.

An interesting and important recent example of EN research centres around SES as a significant factor in learning (**Farah, 2017; Ozernov-Palchik et al., 2019; Rexrode et al., 2019; Fracchia et al., 2020**). SES is a broad-spectrum designation that provides a ‘pervasive context throughout one’s life’, affecting not only physical health and well-being but also cognition and agency (**Kwon, Hampton and Varnum, 2017, p. 383**). One particular dimension is the way that poverty-related stress affects brain development and processing (**Kim et al., 2013; Geronimus et al., 2015; Tomar et al., 2015**). Some researchers, taking an integrative approach (**Lende, 2012**), look to sources of stress in social factors such as policy-produced economic inequality, and seek to understand how children respond (**Ellwood-Lowe, Whitfield-Gabrieli and Bunge, 2020**). This research challenges explanations that reinscribe a collective pathology onto those in poverty (**Wax, 2017; Pitts-Taylor, 2019**) while ignoring the strengths of those in poverty (**Frankenhuis and Nettle, 2020**). This is a good example of how EN supports education’s interest in human flourishing.



7.3

Current contexts

The context of human flourishing gives direction to certain questions about EN. We might ask how EN has reshaped our understanding of learning – then human flourishing gives direction to whether, for example, broadening or narrowing education's conceptions of learning is beneficial for student well-being. We might ask how EN impacts policy-makers and other (non-educator) stakeholders' view of education and learning – then, normatively, human flourishing frames adjudications of the impact of those policies on education. Human flourishing even provides

context for understanding and evaluating more helpful and less helpful metaphors for scientific explanations and models of the relationship between educational practice and neuroscientific research: conceptual tensions over the relationship is – or should be – application of theory to classroom practice, or whether it is – or should be – more embedded models. It helps stakeholders decide whether goals of human flourishing in education are better served through filtering EN through psychological and sociological theories of learners

One conceptual context for (educational) neuroscience is the model of self-understanding of neuroscience, as a science, that frames its research agendas and dissemination.

as persons (in relation, in social settings), or whether it is better to model learners as brains (learning in isolation, in the head). The lens of human flourishing even provides the context for deciding whether the impact of EN is more beneficial or harmful, giving direction to how EN ought to impact educational practice.

7.3 .1

EDUCATIONAL NEUROSCIENCE'S MODEL OF EXPLANATION: REDUCTIONISM AND HOLISM

One cluster of EN contexts is conceptual, and centres around understandings of EN as a field of research. Although not typically thought of as contextual, understandings of EN as a field of study tacitly frame the field of

EN. These provide often unstated contexts for what is envisioned as possibilities and limitations of the various methods and models (approaches, styles, self-understandings) that are brought to the research and dissemination, including implications for educational practices. Should EN be seen as a basic science (with controlled conditions, lab settings) that subsequently is applied to school? Or should it be an 'embedded' model, where researchers – when doing their research – are directly embedded in schools, in situ. Further, is it at base a molecular/cellular science, a cognitive psychological science or an emergent/enactive science? Is its primary mode of explanation reductionist or emergentist/holist?

One conceptual context for (educational) neuroscience is the model of self-understanding of neuroscience, as a science, that frames its research agendas and dissemination. This includes centrally what counts as evidence and what constitutes an explanation. One enduring temptation for EN is to draw



Reductionist accounts typically assume an analysis is required which involves the breaking of complex phenomena into their simplest components, and then explaining each component with a particular underlying mechanism.

its scientific self-understanding from neuroscience as a field of research. In turn, neuroscience's enduring explanatory approach often embraces what is called reductionism (**van Riel, 2014**). This approach is centred in 'explanatory reductionism' (**Borsboom, Cramer and Kalis, 2019**), the idea that learning behaviours can be explained in biological (neuromolecular, neurological) terms. A reductionist explanation typically uses metaphors of levels and mechanisms: biological organization at a higher level is explained by mechanisms at a lower level (**Kaplan, 2015; Eronen, 2021**). Behaviour at the higher level (e.g. person) is explained by a cause-and-effect mechanism at the lower level (e.g. brain) (**Illari and Williamson, 2012; Soom, 2012**). An example from high school biology is explaining classical (mendelian) genetics of (say) eye colour in terms of molecular genetics (**Brigandt and Love, 2017**). Reductionist accounts typically assume an analysis is required which involves the breaking of complex phenomena into their simplest components, and then

explaining each component with a particular underlying mechanism. In neuroscience's reductionist paradigm, cognitive phenomena at a higher level (the learner as person) are analysed into basic components and then explained by neurological mechanisms at the lower level; the higher-level phenomenon is said to be explained, without remainder, by something at the lower level (the brain) (**Bickle, 2003**). Cognitive phenomena such as attention, memory, thought, perception and judgement typically are explained by localized neurological mechanisms (**Kaplan, 2015**).

The reduction metaphor highlights several conceptual issues. The phenomenon to be explained is often not reducible as given but needs recasting or redescribing in terms that are more amenable to analysis. Often this means simplifying its complexity by identifying and isolating central parts of the behaviour to make them explicable by underlying (localized) mechanisms. For example, analysis of a complex psychological phenomenon such

as learning requires simplifying it into ‘functional sub-types’ that are ‘co-extensive with neuropsychological types’ (**Soom, Sachse and Esfeld, 2010, p. 7**). This makes the psychological sub-type of learning, say, how to do mathematics or how to read, amenable for mapping onto localized neural correlates (**Dehaene et al., 2010; Hruby and Goswami, 2011**). In turn, a reductionist mode of explanation depends on the assumption that there can be no change in mental activity without a correlative change in brain activity. To make this explanatory metaphor plausible, complex learning activities (such as reading) are recast as functional subtypes, namely, in terms of their (potential) causal relationships. This allows a particular observable behaviour (e.g. reading) at the higher level to be explained in terms of causal mechanisms at the lower level (**Borsboom, Cramer and Kalis, 2019**). But, despite the ubiquity of this approach in neuroscience, critics point out that ‘causation cannot just be literally read off experimental findings’ (**Andersen et al., 2018, p. 238**). And,

perhaps equally troublesome, the notion of causation used in these explanations is often questionable, conflating causation with correlation (**Marchionni and Reijula, 2019**).

This leads to a narrow view of the content of mental state, typically interpreted in representational terms: the mind contains mental representations of the world, and thinking involves producing, recalling and recombining mental representations (**Joldersma, 2016a**). The reduction then can occur by explaining the mind’s manipulations of mental representations through the brain’s computations of information, often imagined as being carried in physical symbols. This neural correlation is often interpreted in causal terms: particular contents of cognitive states are caused by particular neural states. This typically rides on the assumption that brains ‘are for’ information (and symbol) manipulation and that neural processes are forms of symbol manipulations (**Glenberg et al., 2007**). These assumptions are the conceptual context for EN



explanations using metaphors of information, computation and representation (**Borck, 2011**).

This narrow view of content typically assumes learning is context-free: all that is important to learning (thinking, cognizing) is inside the head, and thus in the brain. The social and physical worlds, including the lived body, are then reduced to mere external inputs that can be bracketed in modelling how learning happens (**Ashourvan et al., 2019**). Further, the idea of information associated with the narrow view of mental content is ambiguous. In cognitive science (psychology), the term ‘information’ is typically used to include meaning, namely, semantic content about the world. In neuroscience, often the idea of information, called ‘Shannon information’, refers to correlations (statistical differences) between two brain states, while remaining agnostic concerning (mental) semantic meaning (**Maley and Piccinini, 2015, p. 80**). The contrast between the two notions of information is important: ‘Shannon information’

is purely quantitative, whereas (cognitive) semantic content is qualitative, and resistant to quantification. This fundamental difference undermines the narrow interpretation of cognition required for the one-to-one mappings of neural correlations used in reductionist explanations that are standard in much of neuroscience.

This explanatory mode is the context for claims that are typical in EN about learning: brains learn, brains think, brains imagine. Some educators and educational researchers, however, argue that these neuroscientific statements about brains revolve around a category mistake, or what philosophers call a ‘mereological fallacy’: that the brain ‘is made to stand for the whole in some reified sense’ (**Williams and Standish, 2016, pp. 19, 20, emphasis in original**). For example – this criticism states – pain is not a brain state; pain is a conscious feeling, often localized somewhere in the body. This critique says that when EN talks about brains learning, they are using the wrong category; just

... brains are
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like it is a category mistake to say that legs walk, it is a mistake to say that brains learn when we mean that a whole person does so. Learning is not a neuronal activity but a human one (Arievitch, 2017; Bannell, 2019). Reductionism is an enduring if implicit continuing context for EN in its relationship to education.

However, this model is changing. Recently, other modes of explanation have entered the picture, ones based in the metaphor of emergence and emphasizing holism, taking into account the brain's context (Moreno and Schulkin, 2019). Rather than using the metaphor of the brain as a computational processor (a complex machine/mechanism) isolated inside the skull, the metaphors of these explanations cluster around the idea that brains are coordinators of dynamic patterns of embodied (sensori-motor) interactions with one's surroundings. This metaphor draws on a model of open dynamic systems, connoting interacting elements out of which emerges a stable but dynamic

whole. The metaphors of 'open' and 'dynamic' assume non-static, non-linear (non-mechanical) interactions by the system's elements; the metaphor of 'system' intimates an emergent whole that isn't merely the sum of the particular processes that support and sustain it: the whole isn't directly proportional to the sum of its dynamic elements. In this explanatory model, the brain is taken to be a dynamic, complex system (Van Gelder, 1998; Schönér, 2008; Engel, 2011); macro-scale patterns emerge out of micro-scale feedback loops (recurrent networks) and distributed processing (non-linearity), an emergent self-organization that constrains (shapes) the processes that support it. When the brain is modelled as a dynamic open system, its supporting dynamic elements are said to be constrained – coopted – by higher-order (global) dynamic patterns of brain action. Although there may still be talk of levels, this is more a heuristic device than referencing reducible hierarchical levels, and is instead bound up with integrative explanations of complex systems.



Rather than viewing learning in a reductionist and narrowing way, learning is modelled as a process undertaken by an embodied student, embedded in their surroundings.

This approach of thinking about the brain has changed the notion of cognition as well. Some use the metaphor of enactment, theorizing an enactivist understanding of cognition: they imagine a substantive, enduring relation between mind, brain, body and surroundings embodied. According to this model, brains are not for thinking (traditionally understood as computation or symbol manipulation); rather, brains are understood as a central part of an embodied nervous system that function as a guide to bodily action, activating and coordinating the body's movements in its surrounding and experienced world – a sensorimotor coupling of body with world. Further, in this emergent model, the body is not (first of all) an object (open to scientific discovery) but a subject: an intentional being trying to exercise (bodily) understanding of the experienced world by moving about in it (Thompson, 2005; de Gelder et al., 2010; Joldersma, 2016a). Explanations of this model are modelled as emergent, non-linear and non-deterministic. This

approach attempts to retain, in its research and conceptualizations, that 'a child surrounds this brain' (Rapp, 2011, p. 3). Rather than viewing learning in a reductionist and narrowing way, learning is modelled as a process undertaken by an embodied student, embedded in their surroundings, with anticipations of particular ways of living; active participants in families and communities. Instead of bracketing these factors, an emergent, dynamic model of the brain can more readily include these in its modelling of learning.

An important development in this regard is the ambitious 'connectome' approach to brain mapping (Sporns, 2011). The term 'connectome', echoing other 'comprehensive understanding' undertakings such as the genome project, endeavours to create a comprehensive mapping of all the interconnections in the brain. More than just advances in technique and data sharing, this approach is a new paradigm (Elam et al., 2021, p. 2), understanding the brain as a complex network or, more accurately, clusters of

... understanding the brain as a complex network or, more accurately, clusters of interconnected structural and (functional) dynamic networks in the context of the whole person interacting with their environment.

interconnected structural and (functional) dynamic networks in the context of the whole person interacting with their environment. The connectome approach of mapping neural networks has given us new insights into the brain in its whole-person context, including, for example, around individual differences of autobiographical memory (Petrican et al., 2020), propensities to trust (Feng et al., 2021) and educational attainment (Bathelt et al., 2019). This non-reductionist approach is promising in the EN context.

student (the learner, the pupil, the child) typically shape EN? What relationship is often assumed between mind and brain, between person and neuron, between body and head? Does EN have a Western bias, mostly generalizing from Western populations in industrialized and wealthier nations? Do the participant pools studied in EN research encompass social and cultural diversity? Assumptions about ‘the learner’ continue to tacitly frame EN and its relationship to education.

The continuing allure of EN research is its promise to help with the effectiveness and efficacy of educational practices – fixes for a perceived broken system (Flokk, 2015). Promising results include: MRIs showing that intensive remedial educational interventions in reading instruction change the brain’s white matter in poor readers (Simos et al., 2002); fMRIs and fNIRSSs successfully exploring brain regions supporting language learning, mathematical processes and executive functioning (Artemenko et al., 2018); EEGs helping illuminate a variety of complex cognitive tasks, including

EDUCATIONAL NEUROSCIENCE'S MODELS OF LEARNING AND THE LEARNER

Another important conceptual context for EN is its understanding of the learner (student) and learning. What models and metaphors of the



Does EN have a Western bias, mostly generalizing from Western populations in industrialized and wealthier nations? Do the participant pools studied in EN research encompass social and cultural diversity?

cognitive load, knowledge representation and when cognition occurs (**Örün and Akbulut, 2019**); eye-tracking aiding in understanding visual and other forms of attention (**De Smedt, 2018; Antonenko, 2019**). Recent research suggests that these sorts of studies are promising in a number of educational areas: in developing causal models of non-typical cognitive development (attention deficit hyperactivity disorder (ADHD), autism, dyslexia, dyscalculia, cognitive impairment); in predicting or prognosing educational outcomes, especially early identification of students who might struggle later on in schooling; and in understanding educational learning at a biological (brain, neurological) level (**De Smedt, 2018**). Of course, to translate ‘promise’ into knowledge that is useful in the classroom requires researchers to partner with educators in the design, implementation and interpretation of such research.

EN often offers cognitively understood learning theories (**Antonenko, 2019; Lin, Parsons and Cockerham, 2019**). However, from

the perspective of whole-person flourishing, these theories have a narrow understanding of learning: they are individualist and cognitive, often minimizing or externalizing important dimensions of the learner such as emotional depth (**Immordino-Yang, 2015**), sociocultural contexts (**Han, 2017**) and normative visions (**Biesta, 2019**). Moreover, traditional cognitive learning theories are prone to further simplification: learning is analysed into a complex (hierarchical) tree of components amenable to isolation for neuroscientific investigation: processing speed, mental rotation, diagrammatic reasoning, short-term memory, working memory, long-term memory, visual attention (**Antonenko, 2019**). Learning at the cognitive level is then expressed as the formation of associations while learning at the neuroscientific level is often described as a permanent change in neuron firing and wiring (**Gallistel and Matzel, 2013**). These narrow interpretations of learning are often in tension with the broader senses of learning that educators ascribe to learners.

... those embracing a neurodiversity conceptualization
... –question the pathologizing of neurological differences as impairments and deficits.

A related conceptual context that can influence how EN models the learner and learning centres around a bifurcation of normalcy/pathology. Although the terms ‘normal’ and ‘abnormal’ have helpfully been replaced with terms like ‘typical’ and ‘atypical’, in the popular imaginary of many societies the terms ‘normal’ and ‘abnormal’ continue to buttress education (see **WG3-ch3** and **WG3-ch6** on discussion related to this topic). This category bifurcation is often expressed in medical terms, continuing the ‘medicalization of deviance’ (**Conrad, 2013; see also Cohen, 1983; Petrina, 2006**). Medicalization involves categorizing differences as deficits or disorders, describing them as pathological, using medical concepts and perhaps requiring medical intervention (**Kaczmarek, 2019**). For example, differences in discipline-specific skills – including reading (phonemic awareness), mathematics (numeracy, symbol understanding) and science (concept recognition) – are prone to homogenization into the bifurcated categories of typical (normal) and deviant

(pathological), as are generalized abilities such as executive functioning and emotional regulation (**Thomas, Mareschal and Dumontheil, 2020**). Or, learning disability is traditionally defined as a neurobiological disorder, marked by deficits in reading, writing and/or mathematical abilities (**Mirici et al., 2018**). EN, then, often researches contrasting neural correlates within the bifurcated groups (**Di Liberto et al., 2018; Mayes et al., 2018**), supporting the normalcy/pathology schema.

However, others in EN – for example, those embracing a neurodiversity conceptualization – question the pathologizing of neurological differences as impairments and deficits (**Kapp, 2020**). The deficit model is being challenged in various ways, not only through conceptualizing neurological differences as neurodiversity (**Lambert, 2018**), but also from a ‘strengths’ approach (**West, 2020**), from a ‘dimensions’ perspective on learning differences (**Child et al., 2019; Bernabini et al., 2021**) and by challenging the category



schemas themselves (**Protopapas and Parrila, 2018**). Further, recent EN recognizes that ‘[n]ormal and abnormal cannot be defined without understanding the beliefs, values, and power structures of a cultural group’ (**Mason, 2015, p. 345**). Certainly, many helpful assessments have resulted from medically conceptualized diagnoses, where struggling students have been significantly helped (**Ansari, 2015a**). Nevertheless, the contextual question that

EN needs continually to ask is: When is it helpful and when is it not helpful for EN to rely on a bifurcating medical model with respect to students’ flourishing? Given the wide variations in learning abilities – and astonishing variability between persons – the normalcy/pathology schema needs constant scrutiny (**Matus, 2019**), particularly in the context of the broader understanding of human flourishing rather than human capital development.

... understanding learners in their psychosocial, socio-economic and sociocultural contexts is vital for approaches that accent the broader goal of holistic well-being.

When the goal of education is human flourishing, the broader senses of learning remain important; understanding learners in their psychosocial, socio-economic and sociocultural contexts is vital for approaches that accent the broader goal of holistic well-being. EN would do well to continue to expand its self-understanding of what constitutes learning, and who is the learner. There has been some promising research in that regard: including the importance of emotions in learning (**Immordino-Yang, 2015**); situating EN in a sociocultural context (**Hall, Curtin and Rutherford, 2013**); recognizing that learning is undertaken by embodied learners (**Fugate, Macrine and Cipriano, 2019; Shapiro and Stoltz, 2019**); acknowledging that learners are enactively embedded in their surroundings (**Gallagher and Allen, 2018**); and modelling the brain as a dynamic open system (**Ashourvan et al., 2019**). The latter has been used, for example, to think differently about music learning (**Schiavio et al., 2017**), moral development (**Sankey and Kim, 2016**) and science study (**Lamb, Cavagnotto and Akmal,**

2014). These more holistic, emergent, contextual and dynamic approaches to understanding the learner – and modelling learning – has promise for neuroscience research supporting human flourishing.

7.3 .3

CONTEXTUAL SOCIETAL FACTORS: POLITICO-ECONOMIC, SOCIOCULTURAL

EN as a field is profoundly affected by its social, cultural, political, and economic contexts. Understanding EN's contexts therefore requires making visible multiple societal contexts that shape both the research field itself and its direct or indirect uses in/as educational practices. These include what could broadly be called politico-economic and sociocultural contexts. By 'political' we mean systems of power, often in the form



... more holistic, emergent, contextual and dynamic approaches to understanding the learner – and modelling learning – has promise for neuroscience research supporting human flourishing.

of legislated policies, funding directives and standards; by ‘economic’ we mean systems of capital exchange, often in the form of entrepreneurship, commercialization and capitalization. By social we mean a realm of society integrated by a sense of community (solidarity), rather than power (the political realm) or money (the economic realm) – a sphere that social theorist Jurgen Habermas (1991) calls ‘civil society’; by ‘cultural’ we mean systems of collective expression that show variations around the globe in various societies. Although conceptually distinguishable, these contextual factors operate in the same societal spaces and mutually influence each other.

7.3 .3 .1

POLITICO-ECONOMIC CONTEXTS

EN – as well as other educational research – shows that brain functioning, human development and student learning are all complex processes. However,

within what can broadly be called the ‘political context’, this complexity is often bracketed or minimized: politicians, policy-makers, educators, parents and business entrepreneurs often want simple solutions and strategies. The continuing pressure to simplify is not neutral but has profound effects on how students might or might not flourish. As EN is often seen as a ‘remedy’ for a failing education system in the public imaginary (Flobakk, 2015), it comes as no surprise that EN findings have been of great interest to educational policy-makers (Thomas, 2017). For example, oversimplifications of EN’s findings become tempting bases for commercial products. Particularly when formal schooling, as a social institution, is under relentless pressure to improve with respect to a globalizing regime of standardized testing, commercial products become tempting supplements which might not only complement pedagogical practices, but – more problematically – supplant them.

The general public, including professional educators and policy-makers, often don't have the background to assess the validity of the claims made about commercial products.

Ever since the 'decade of the brain', business entrepreneurs have leveraged neuroscientific knowledge into commercial products, typically offered as aids to learning. Some, such as LearingRx, CogMed and Lumosity, target students to use computer-centred activities; these products claim to train the brain to become more efficient and effective in learning. Others make claims based in brain plasticity research; they claim their product enhances particular neurological pathways, boosting cognitive functions like memory and attention (Hurley, 2012). Others, including Brain Targeted Teaching, Fast ForWord® and MindUP (Busso and Pollack, 2015), target teachers and other educators, assuring them that their product will enhance their effectiveness in teaching. The general public, including professional educators and policy-makers, often don't have the background to assess the validity of the claims made about commercial products. These products typically don't distinguish between – and sometimes

even conflate – products that are actually supported by neuroscientific research, those that are loosely derived from such research, or products that are merely inspired by brain research (Sylvan and Christodoulou, 2010). Such vagueness can lead to misrepresenting such commercial products in their effectiveness. Continued critical appraisals of commercial products is vital; the accuracy of commercialized claims requires continued, informed assessments.

Thankfully, research critical of commercialized products is ongoing; there are many who bring a critical eye to commercial and clinical products (Redick et al., 2013; Zickefoose et al., 2013; Walker, Thompson and Oliver, 2014; Shute, Ventura and Ke, 2015; Raz and Rabipour, 2019; Naufel and Klein, 2020). Some of these focus on the accuracy of the claims, while others address more explicit ethical dimensions including issues of accountability (Martinez-Martin and Kreitmair, 2018). However, concerns about faulty products can have alternative motivations: their potential to



dampen ‘economic growth’ (**OECD, 2019, p. 5**) or their possible harmful effects on ‘human flourishing’ (**Kreitmair, 2019**). Harm can take various forms: actual harm to brain development, but also stigma around mental health or self-perception. Because financially motivated commercialization can harm students, especially the most vulnerable populations, it remains crucial for educators, researchers and policy-makers to make informed decisions about commercial products based not only on credible research but also on what ethical vision of living together is being promoted.

The issue of commercialization of EN research brings to light a broader politico-economic context: neoliberalism.

Choudhury and her co-workers note that ‘scientists are working at a time of unprecedented politicization through commercialization of research’ (**Choudhury, Nagel and Slaby, 2009, p. 68**). Indeed, the discourse analysis research by Flobakk (2015) shows a clear link between EN and neoliberalism within the

political field and how findings from EN are used to justify political decisions. Neoliberalism is a cluster of ideas that relate individuals (citizens, consumers) to power (governments) and money (economies) (**Harvey, 2005, 2016**). At its simplest, neoliberalism is a vision of small government that commodifies more and more areas of society to bring them into the market economy for profit and capital accumulation. For the last number of decades, formal education has become a rich terrain for commodification, commercialization and capital accumulation. For example, outsourcing assessment to formally non-profit organizations like the College Board ‘netted them an estimated make \$150–\$160 million in profits for 2019’ (**Financial Samurai, 2020**). The College Board (in turn) outsourced its test scoring to the for-profit Pearson Educational Measurement, the USA’s ‘largest commercial processor of K-12 student assessment tests’, where educational assessment has been narrowed to fit Pearson’s ‘online proprietary Electronic

Continued critical appraisals of commercial products is vital; the accuracy of commercialized claims requires continued, informed assessments.

Performance Evaluation Network (ePEN)' (**Pearson, 2003**). Such standardizing and outsourcing means that what counts as learning gets narrowed, to fit with what is measurable by this proprietary mechanism. This narrowing is not neutral; there is evidence that it affects populations of students differentially, showing greater harm to those on the margins of society (**Au, 2015**). These neoliberal moves within formal education form an economic context within which EN operates; the narrowing of what constitutes learning through such standardization impacts EN's terrain of research.

In contrast to neuroscience research which looks exclusively at internal processes ... social neuroscience focuses more broadly on the brain's function in its social context.

This narrowing through commercialization of assessment instruments goes hand in hand with a more general neoliberal narrowing of student learning – for human capital development (**DeLissovoy and Cedillo, 2016; OECD, 2019**). Global policy drivers, such as the OECD, shape what counts as cognition and knowledge in education (**Maire, 2020**). Such narrowing of education emphasizes basic

skills and practical knowledge so that students can become more effective workers permanently ready for the changing, precarious economy (**Olszen, 2008; Brown, 2011**). Neuroscience can and at times has been coopted by this neoliberal vision (**Rose and Abi-Rached, 2013; Pitts-Taylor, 2016**): supporting the narrowing of learning as human capital development (**Millei and Joronen, 2016**); legitimating 'grit' and 'resiliency' research (**Wang et al., 2017**); and coopting of plasticity research to 'responsibilize' the learner (**Pitts-Taylor, 2010; Joldersma, 2016b**). This, however, is not intrinsic to EN: it equally supports educational practices that lead to flourishing for all students, rather than reinforce savage inequalities.

7.3 .2

SOCIOCULTURAL CONTEXTS

Although traditionally EN has focused narrowly on the mind and brain in isolation from humans as embodied persons living in social settings, emphasis on embodiment of mind and brain, and on the



embeddedness of (embodied) persons in society and culture, has entered the field. This has, in turn, raised new awareness of social and cultural contexts for EN.

The recognition that humans are social beings has given rise to a new field: social neuroscience (**Todorov, 2011; Decety and Cacioppo, 2015**). In contrast to neuroscience research which looks exclusively at internal processes such as attention, memory, representation, executive functioning and

reasoning, social neuroscience focuses more broadly on the brain's function in its social context. As a field, it investigates how the brain supports 'communication, social perception and recognition, impression formation, imitation, empathy, competition, cooperation, pair-bonding, mother-infant attachment, bi-parental caregiving, social learning, status hierarchies, norms and cultures, social learning [sic], conformity, contagion, social networks, societies, and culture'

Social neuroscience makes explicit the already implicit social context for all brain functioning, and thus for all neuroscientific investigation.

(Cacioppo and Cacioppo, 2020, pp. 7–8). This long list of topics is not in direct competition with those of more traditional EN; however, neither is it simply a neat division of labour. Social neuroscience's operationalization of the recognition that humans are social creatures means that the topics of EN ought to take the person's social situatedness into account, even when investigating seemingly more internalized processes such as attention, memory, reasoning and the like. For example, the importance of human interactions such as social touch, both in early development (Gliga, Farroni and Cascio, 2018) and in later life (Reddan et al., 2020), point to important continuing social contexts for both brain development and human flourishing. Social neuroscience makes explicit the already implicit social context for all brain functioning, and thus for all neuroscientific investigation.

Social neuroscience is becoming embedded in EN. When learning itself is not considered as something that occurs in the

individual brain, in isolation, but is itself a social process, then EN is no longer restricted to asking how the brain supports learning, but how learning itself changes (reorganizes) the brain (Richaud, Filippetti and Mesurado, 2019). This lens looks at context by, in a sense, flipping the script: the brain is shaped by learning experiences, as it is by other social interactions. Social neuroscience in education attends to the social roles of communication and collaboration in learning: for example, social processing of other people's beliefs and feelings or attending to the developing brain in its socially embedded context (Immordino-Yang, Darling-Hammond and Krone, 2019). In this regard, hyperscanning research in neuroscience is a promising development in social neuroscience (Misaki et al., 2021; Czeszumski et al., 2020).

Further, as Western cultures move beyond their eurocentrism, the visibility of cultural diversity and influence within and between societies has become increasingly evident. Culture is typically understood as ideas, beliefs, values,



The field of cultural neuroscience takes into account how cultural variation across the globe might influence not only how people think and act, but also how this influences brain functioning.

norms and practices shared by groups of people. The emerging field of cultural neuroscience is changing our understanding of the brain. As a field, it draws from anthropology, cultural psychology, neuroscience and population genetics; its research focuses on interactions between culture and biology, including how neural processes are affected by cultural traits and relations (**Chiao, 2010; Han, 2017; Sasaki and Kim, 2017; Pedraza, 2020**). The field of cultural neuroscience takes into account how cultural variation across the globe might influence not only how people think and act, but also how this influences brain functioning.

The importance of the context of culture for EN is becoming clearer. When 90 per cent of neuroimaging studies come from Western industrialized countries, with 12 per cent of the world's population (**Chiao, 2010, p. 5**), generalizing the results across cultures is problematic. Cultural neuroscience has found distinct cultural influences on brain function for a variety of important

social interactions: valuing individualism or collectivism; preferring social dominance or egalitarian norms; identifying with one's cultural group (racial or ethnic identification); seeking social support; visual cognizing, perceiving and attention; developing language and meaning; understanding fairness; and regulating emotions (**Chiao, 2010; Han, 2017; Pedraza, 2020**). The broad array of cultural influence on neural processes means that, on the one hand, interpreting many current educational neuroscientific studies requires caution about overgeneralizing, while on the other hand, EN needs to attend more systematically to the context of cultural variability. Moreover, when culture itself is connected to power, bias and oppression, the context of neuroscience expands further, to include contextual issues of racism and injustice (**Malinowska, 2016; Lewis, 2020**). EN – particularly in its inevitable connection with the culturally indexed practice of education – does well to consider the cultural differences in its research and applications.



7.4

Challenges to educational neuroscience

The continuing contexts of EN include a set of challenges that arise in its relation to educational practices and activities such as teaching and learning. Education as a field of research gives access to reality in a certain way, while neuroscience as a field of study gives access to reality in a markedly different way.

7.4 .1

CHALLENGES RELATED TO COMPLEXITY OF LEARNING

As we have seen previously, not only is the brain a complex



... the learning crisis is related to the fact that many education systems across the developing world have little understanding of who is learning and who is not.

system, but formal education is a broad and complex concept as well. A recent report by the World Bank (2018) argues that the world is in the midst of a learning crisis: education should not be seen as merely schooling but should focus more on learning. Learning in school is not simply the acquisition of knowledge and skills but also includes the acquisition of values, beliefs and habits. In addition, learning always happens within the political and social context of a particular school and school context. As such, learning in educational institutions is a complex intersubjective pattern of action involving motivations, relationships with teachers and peers, familial settings, as well as societal policies for education. Finally, the learning crisis is related to the fact that many education systems across the developing world have little understanding of who is learning and who is not.

EN has already shown that it can go beyond what psychology can offer education; it can show not only possible cognitive

mechanisms to explain who will benefit from interventions or not but, more importantly, it can show which one is actually delivered by the brain (Thomas, Ansari and Knowland, 2019). As such, EN does not just provide insight into who is learning and who is not, it can also provide better insight into what learning is and, therefore, how learning can be measured more accurately.

However, the child's educational outcomes, as shown in Urie Bronfenbrenner's writings (e.g. Bronfenbrenner, 1979), are also impacted by wider school, societal and familial as well as governmental factors. EN can improve educational outcomes by showing how the most proximal factors such as ability, motivation and attention, health and nutrition can impact learning (Thomas, Ansari and Knowland, 2019). However, the impact of EN on other aspects of learning such as the institutional, professional, wider political, societal and economic influences on learning is still limited.

... recent research in EN has started to explore factors that are important to the wider social classroom environment, such as the mechanisms underpinning social and emotional processes that may impact on classroom behaviours.

Yet, recent research in EN has started to explore factors that are important to the wider social classroom environment, such as the mechanisms underpinning social and emotional processes that may impact on classroom behaviours. This includes mechanisms that underpin gaze processing, joint attention, face processing, action observation, reasoning about other people's mental states, emotion regulation as well as peer acceptance and rejection (Blakemore et al., 2013; Hoorn et al., 2016; Martin and Ochsner, 2016). Although improved social and emotional well-being – for example, yoga training (Butzer et al., 2016), mindfulness training (Felver et al., 2016; Wheeler, Arnkoff and Glass, 2017) or the impact of pollution on learning (Annavarapu and Kathi, 2016) – can facilitate learning and improve educational outcomes, neuroscience findings on social and emotional processes have not yet been systematically applied to classroom interventions.

7.4 .2

CHALLENGES RELATED TO RESEARCH

Whenever research areas overlap, challenges arise around appropriate methods and what constitutes data, on the one hand, and interpretations of basic educational concepts, such as learning, on the other (Howard-Jones, 2008, 2011), and this does not yet recognize the conceptual challenges within educational research itself. For example, there is no firm agreement on what counts as 'legitimate' knowledge or 'good' teaching, where the term 'good' signals something normative rather than effective (Biesta, 2009, 2017), which is often situated in different visions of the role of education in society and what counts as a good society. These challenges around self-understandings form tacit but important contexts for EN in its relation to education, including its support for education's goal of human flourishing.



Attempts in EN at integrating the various clusters of research – the ‘biological, behavioral, and social contexts’ (**Knox, 2016, p. 6**) – is the difficult task of bringing together different discourses, meanings and depictions of reality. Rather than be concerned with boundaries of academic disciplines or building bridges between research areas (**Bruer, 1997, 2008**), EN as a cluster is better served with a self-understanding of ‘openness, flexibility, and disciplinary pluralism’ that is ‘problem-centered, integrative, and innovative’ (**Knox, 2016, p. 6**). However, even a transdisciplinary perspective – being open, flexible and problem-centered – does not necessarily address the foundational beliefs that shape the methodologies and theories of the various disciplines being transcended (**Palghat, Horvath and Lodge, 2017**). Certainly the potential role of co-designing research projects and collaboration across disciplines is important and a significant step towards transcending the limitations of any one discipline. But because basic beliefs about reality, explanation

and application will continue to shape the integrations and innovations of EN, continuing contextual questions need to include: Who gets to adjudicate the translations of the knowledge from various disciplines into solutions for transdisciplinary problems? Whose view of access to reality is privileged? For example, some might believe in ‘positive realism’, others might hold a ‘constructivist viewpoint’ (**Palghat, Horvath and Lodge, 2017, p. 5**), while a third group might argue for an ‘embodied cognition’ perspective (**Crifaci et al., 2015**).

7.4 .3

CHALLENGES RELATED TO TRANSLATION

Learning has multiple realizations in the brain and about eight different learning systems in the brain have been identified (**Thomas, Ansari and Knowland, 2019**). Although these learning systems all work together, they respond

EN as a cluster is better served with a self-understanding of ‘openness, flexibility, and disciplinary pluralism’ that is ‘problem-centered, integrative, and innovative’.

Neuromyths, broadly, are overly simplified facts about the brain which lead to suggestions about learning in general as well as teaching practices that are incorrect.

differently over time and are impacted differently by training regimes or external factors such as motivation and emotional state. Because learning is a complex whole-person activity, EN will likely always require translation to become ‘classroom-ready’ knowledge (Howard-Jones, 2010). For example, neuroscience techniques often show the additional neural activity associated with a particular task or condition. To an uninformed lay person the ‘hot-spots’ on these images could easily be interpreted as static and isolated functional units that are causative in nature, leading to a number of incorrect interpretations or neuromyths. In addition, if scientists have never taught a child with learning difficulties or a demotivated secondary school child, then it is unlikely they can understand how their findings may directly translate into practice. So even when animal models of air pollution on brain function are able to show a direct causal link between air pollution and cognitive abilities, for example memory abilities in rats (Salvi et al., 2017), these

findings and their consequences for education will still need to be translated into practice in a way that can be understood by policy-makers, practitioners, parents and students.

Translation therefore requires the sharing of a common language and an understanding of the research designs and limitations as well as an understanding of educational policies and practice. A lack of either of these may lead to oversimplification of complex mechanisms or neuromyths. Neuromyths, broadly, are overly simplified facts about the brain which lead to suggestions about learning in general as well as teaching practices that are incorrect. Neuromyths are commonplace in the general population, including among politicians and teachers (Howard-Jones, 2014). What makes them neuromyths is that the claims are based in scientific facts that are oversimplifications of the data or are at best loosely based on neuroscience research (Pasquinelli, 2012; Tardif, Doudin and Meylan, 2015). Their mythical status means they



are enduring: even when the claims are repeatedly shown to be false, they continue to circulate as scientifically based truths. These include claims such as: students use only 10 per cent of their brains; students have different learning styles (e.g. visual, auditory, kinaesthetic); water drinking enhances learning; sugary drinks increase distractibility; motor-perception exercises improve literacy skills; physical coordination exercises increase left–right brain integration (**Geake, 2008; Dekker et al., 2012**).

Among the most widely shared neuromyths are problematic claims about intelligence, brain structure, teaching, learning, human development, mind–body relationships, plasticity, memory, attention and language acquisition (**Tokuhama-Espinosa, 2018**). Although they have been repeatedly debunked, neuromyths continue to exist around the world (**Gleichgerrcht et al., 2015; Hermosilla et al., 2016; Papadatou-Pastou, Haliou and Vlachos, 2017; Betts et al., 2019; Grospetsch and Mayer, 2020; Janati et al., 2020; van Dijk and Lane, 2020**) and in various educational subjects (**Bailey et al., 2018; Ruhaak and Cook, 2018; Grospetsch and Mayer, 2019**). The presence of these myths requires continued vigilance (**Tokuhama-Espinosa, 2018; Grospetsch and Mayer, 2020**), not only because misleading claims undermine the science itself, but also because it can be damaging to the practice of education, including for student flourishing and for life more generally.

Recent evidence suggests that awareness campaigns around neuromyths and provision of neuroeducational resources might improve endorsements of neuromyths (**Gini et al., 2021**). However, neuromyths are sometimes kept alive by the enthusiasm of policy-makers and stakeholders to produce quick fixes that shape policy and funding in education, as well as the drive for practitioners to use evidence-informed practice. Such research funding and mandates can skew towards ‘quick-fix’ solutions, relying more on simplified popular messaging than on more complex sets of evidence – including

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evidence that is contrary to the proposed solution. For example, the incredible development during the early years and key findings in neuroscience about changes in the brain during this developmental period, have driven key political movements and investments related to supporting education during the early years (e.g. 'zero to three movement' in the USA and the Early Years Royal Foundation in the UK). Although there is no doubt that the early years are an extraordinary and vital part of child development, focusing on the first few years exclusively underplays the development that happens right through childhood and adolescence, and could potentially impact on opportunities to help people flourish. For example, during adolescence, there are dynamic changes in brain biology and similar processes to those in the womb and early development, such as over-production of cells and connections (**Giedd et al., 1999**). Although there is enormous potential for development during this time, this potential is often overshadowed by an exclusive

focus on the early years.

To prevent translation issues, a clear interdisciplinary and collaborative approach is required among all of the disciplines (biology, education, and the cognitive and developmental sciences) as well as the stakeholders involved (scientists, practitioners, public policy-makers and the public). This requires the building of a common language through a long-term continuing dialogue. To facilitate translation, an infrastructure is required that allows stakeholders to exchange ideas and knowledge, such as the International Mind, Brain and Education Society (**2004**). However, such an infrastructure should also incorporate the establishment of large databases that include behavioural as well as biological information about child development and educational outcomes. Although there is mixed evidence regarding whether training in neuroscience can actually minimize the development of neuromyths (**Macdonald et al., 2017**), providing teachers and stakeholders with



an understanding of EN as well as training in research designs informed by neuroscience and genetics would counteract misconceptions but also instill the scepticism that is needed to evaluate novel educational programmes as well as tools for teachers to provide evaluations of educational programmes (Fischer et al., 2010; McMahon et al., 2019; Gini et al., 2021).

Better collaboration between practitioners and scientists would not only ensure that EN answers questions that are relevant to practitioners or for teachers to correctly implement EN-informed practice in an educational context, but would also allow greater insight into differences between schools and school contexts and how these impact on educational

outcomes (Hackman and Kraemer, 2020).

7.4 .4

CHALLENGE OF VALIDITY

Another challenge for EN to inform education policy and practice relates to the validity of the EN research conducted thus far. Most EN studies have been carried out in controlled laboratory conditions and this can sometimes lead to oversimplified theories and leave out processes that are critical to what makes us truly human. For example, research has shown that successful mathematical abilities rely on the

... several approaches have been used to improve the representativeness and therefore translatability of, for example, neuroimaging research.

interaction between a number of domain-specific (such as symbolic knowledge) and domain-general abilities (**Bartelet et al., 2014; Costa et al., 2018**), in addition to factors such as teacher anxiety and abilities, student affective factors such as self-efficacy (**Kaskens et al., 2020**) and home-learning environment (**Mutaf-Yıldız et al., 2020**). The neuroscience of numerical cognition has often focused on controlled experiments with neuropsychological patients and has shown that the intraparietal sulcus (IPS) area is a functional specialization for numerical presentation in the brain that independently predicts numerical quantity abilities in young children (**Ansari, 2015b**). However, it is unclear from these studies whether the IPS region is prominently involved when children solve mathematical problems in the real world. Recent studies have shown that children's neural responses to real-world mathematics problems are better predictors of their mathematical success than neural responses in the lab (**Cantlon and Li, 2013**).

Although it is clear that various ways of mapping the brain, particularly local regions, have given us powerful information about the brain's structure and function, the resultant images also have the inherent and standing weakness of being mis- or over-interpreted, especially in the media and by policy-makers and other stakeholders, including educational practitioners. These include assumptions that situate the authority and claims made on the basis of neuroimages. For example, there are assumptions around the cognitive elements themselves: remembering, attending, choosing; reading, speaking, observing; fearing, raging, nurturing. The assumption is that these are clear and distinct behaviours, and can be safely isolated – methodologically, epistemologically or ontologically. The assumption is not only that nature breaks clearly along these lines, but also that we can study and understand them in isolation. On these assumptions are built the claims that brain-imaging techniques and results give us accurate and clear knowledge



... wearable technologies or wearable sensing, can help transform our understanding of the brain through improved, more ecologically valid neuroscience.

of brain processes that correlate to these isolatable behaviours in the laboratory setting (**Almeida, 2019**). However, different basic assumptions about reality – that what we take as real and isolatable depends on a figure/ground (focus/context) structure, means that isolation often fails to replicate the *in situ* behaviour, and that language often thins its embodied and relational complexity.

The EN community is increasingly aware of validity issues around laboratory-based research. Thus, several approaches have been used to improve the representativeness and therefore translatability of, for example, neuroimaging research (**van Atteveldt et al., 2018**): (1) using more naturalistic stimuli and tasks to activate brain processes more closely related to realistic situations; (2) combining lab-based neuroimaging measurements with real-life variables and follow-up field studies; and (3) moving neuroimaging research out of the lab and into realistic settings, such as classrooms, using portable EEG or fNIRS devices.

EN is now developing new data-driven approaches for higher-order neural activity (**Cantlon and Li, 2013; van Atteveldt et al., 2018; Cantlon, 2020; Nastase, Goldstien and Hassan, 2020**). Studies using data-driven approaches of neural responses during naturalistic tasks have shown that children have distinct responses which differ from adults (**Kersey et al., 2019**). Other technological advances, such as wearable technologies or wearable sensing, can help transform our understanding of the brain through improved, more ecologically valid neuroscience (**Ward and Pinti, 2019**).

In sum, the use of naturalistic tasks, new technologies to measure behaviour and brain activation, and new data-driven approaches allow observation of a broader range of neural patterns and functions. However, without strong theoretical explanations, there is a danger that patterns are observed that yield no understanding in the link between classroom behaviour and brain activation (**for further discussion see Cantlon, 2020**).

... focus on improving educational outcomes through practices such as mindfulness training, which work to improve social and emotional skills and competencies necessary for childhood flourishing.

7.4 .5

CHALLENGE OF INCLUSION

The main goal of EN is to enhance the cognitive abilities of children. However, children differ in their abilities, prior knowledge, SES, cultural context, and racial or ethnic background. EN research that is narrowly focused on cognitive abilities can easily miss the larger picture of what works for whom, and how to address all the variability that constitutes student populations – this is a challenge of inclusion.

Further, although the overall goal of intervention studies is improving specific educational outcomes, approaches studying individual differences may remain focused on factors that limit a child's progress, rather than those that may advance outcomes. Both the brain and education are complex phenomena that are impacted by a large number of factors which interact with

one another. However, other intervention studies based on EN focus on improving educational outcomes through practices such as mindfulness training, which work to improve social and emotional skills and competencies necessary for childhood flourishing, and changes in school start time based on findings from sleep and memory research, which work to improve the overall attentiveness of students.

Like research in other social sciences, EN thus far has been largely restricted to developed countries and to so-called WEIRD populations (Western, educated, industrialized, rich and democratic samples) (**Henrich, Heine and Norenzayan, 2010**). These often-small convenience samples mean that EN currently cannot provide much meaningful insight into individual differences. In addition, it is likely that in less developed countries, social factors and environmental factors such as nutrition have a different or more important impact on educational outcomes. Therefore, not only should research extend



... science achievement is predicted by individual factors such as motivation in the two high earning countries, whilst in middle-income countries it is predicted by school factors (e.g. having sufficient resources).

to include developing countries, it should also focus on social and political factors that impact on educational outcomes. For example, Nieto and Ramos (2015) examined factors that affect science and reading achievements in both high-income countries and middle-income countries and found that science achievement is predicted by individual factors such as motivation in the two high earning countries, whilst in middle-income countries it is predicted by school factors (e.g. having sufficient resources). Similarly, reading abilities were also best predicted by school factors for all countries examined.

One promising solution to increase the validity of EN is the focus on population neuroscience (Paus, 2010; Falk et al., 2013; Smith et al., 2015), with a greater emphasis on theory-relevant sampling. Since there are issues of optimal replicability with the small sample sizes of typical fMRI experiments (Makel and Plucker, 2014; Turner et al., 2018), recently, several large-scale initiatives have emerged: the online OpenNeuro database

(Milham, 2012) that contains task-based fMRI data (Poldrack et al., 2013), the NeuroVault database (Gorgolewski et al., 2015) that allows meta-analyses of fMRI data often using activation likelihood estimation (ALE), and NeuroSynth for automated synthesis of fMRI data (Yarkoni et al., 2011). There are also large-scale fMRI data initiatives for autism (Di Martino et al., 2014; Payakachat, Tilford and Ungar, 2016), dyslexia (Lyytinen et al., 2015) and healthy brain development (The Baby Connectome Project (Howell et al., 2019) and The Lifespan Human Connectome Project in Ageing (Bookheimer et al., 2019)).

These efforts will provide a better understanding of how the brain changes over development, how these changes may relate to educational practice, and what social and political factors impact on EN.

Can EN improve ‘living together’ and inclusion? Neuroscience can help explain why some people with atypical brain structures (autism, ADHD) flourish whilst others do not. The social movement of neurodiversity,

A curriculum developed under UDL aims ‘to serve a diverse set of students with a wide range of sensory, motor, cognitive, affective and linguistic skills’.

which challenges the notion of easily categorizable boundaries of ‘special educational needs and disabilities’ (SEND) (**Lewis and Norwich, 2004; also see WG2-ch4**), plays a role in inclusive education that is relevant to teaching and pedagogy and teacher training. The notion of neurodiversity highlights that there are individual differences in how the brain functions and the learning environment needs to accommodate all learners who encompass the entire spectrum of learning abilities, including those with special learning needs. For example, Universal Design for Learning (UDL) is framed within the field of neuroscience and educational technology. A curriculum developed under UDL aims ‘to serve a diverse set of students with a wide range of sensory, motor, cognitive, affective and linguistic skills’ (**Villoria and Fuentes, 2015, p. 2**). Beyond UDL, teacher training and teaching instructions play an important role in accommodating functional diversity present in all classrooms (**Gobbo and Shmulsky, 2019; Aguilar, Melero and Perabá, 2020; Griffiths, 2020**). This is probably where

neuroscience can contribute the most.

7.4 .6

ETHICAL CHALLENGES

Whilst numerous examples can be given of how EN might inform educational practice and policy, it is currently not yet clear what the ethical implications might be or how they should be addressed. Knowland (**2020**) describes a number of ethical factors to be considered by the field of EN. These include: weighing up the risks of any EN intervention compared to the benefits; examining carefully any individual differences in who benefits most from any EN-based interventions; and understanding how the different contexts in which the EN intervention takes place may impact on outcomes. For example, taking slow-acting prescription psychostimulants (e.g. Ritalin) may indeed improve the neuropsychological functioning of those with ADHD (**Boonstra et al., 2005**) as well as healthy young



Ethical challenges do not mean that EN cannot inform educational practice or that we should steer away from EN interventions.

adults (Ilieva et al., 2015). Yet, these medications all have side-effects and taking medication may not only have direct physical negative side effects but may also lead to long-lasting changes in the prefrontal cortex of the brain with further consequences later in life (Ilieva et al., 2015).

Further, in addition to questions about what works and when – for example, if early intervention is better, should infants be given medication, and other EN-based therapies? – there are ethical questions to be considered about how EN interventions can be seen as fair, across individual children, across schools, and across different countries. Studies across several cognitive fields (including reading and mathematics) have shown that low-performing children and those from low socio-economic backgrounds benefit most from educational interventions (Dietrichson et al., 2017). However, this raises the ethical question: if provision of EN interventions will be provided selectively to a few, how will any treatment barriers be defined and by whom? As

Knowland (2020, p. 487) points out: ‘selective provision [...] may result in differences in how children perceive their own academic success and, far from closing the gap, would create a new one driven by differential treatment, which may cause societal problems even greater than the ones the intervention seeks to solve’. Who benefits from EN’s research, and how such benefits are distributed, are ethical questions of distributive justice.

Ethical challenges do not mean that EN cannot inform educational practice or that we should steer away from EN interventions. However, in order for EN to provide clear guidance on what works for whom, clear guidance on the goals of education need to be provided, including the question whether education should improve educational outcomes for all or for those who struggle only (e.g. ‘leave no child behind’ policy)? In sum, we need a better understanding of what we value about education and what we envision good education should provide.



7.5

Conclusions

The overall aim of this chapter has been to examine the broad contexts of and challenges for EN. By this we mean the social, cultural, political, ideological

and conceptual contexts of EN as a research practice in its relation to education. In the background is the question of what role EN might play in



A twenty-first-century vision for neuroscience is one in which discoveries in neuroscience help contribute to human flourishing, broadly conceived.

advancing human flourishing as education's purpose (**developed in WG1**). Human flourishing involves an emergent dynamic ethos connected to socio-emotional development; mental and physical health; and living together well politically, economically, socially and culturally. The lens of human flourishing takes us outside the school walls and into its social, cultural, economic and political contexts, which means also that EN is contextualized in all of those dimensions. Discussion of flourishing particularly brings to the foreground issues of inequality and oppression, which include the intersections of inequality along gender, racial, socioeconomic, religious and cultural dimensions (**WG2-ch4**). What might EN contribute to both understanding, and dismantling, these savage inequalities and oppressions? How might EN studies of vulnerable populations – along various dimensions – give educators good information about the neural impacts of particular inequalities

(e.g. the impact of oppressive poverty) on developing brains (persons)?

We focus on broad contexts not only because they impact EN's information for formal schooling, but also because the broad vision of human flourishing means that EN isn't only for schooling, but for something bigger. Although clearly it has a role of informing practices inside the classroom, we think that it would be fruitful to expand the idea of EN: EN should serve not only formal schooling but its societal contexts as well. Taking a broad human flourishing approach, rather than a narrow human capital approach, has implications for understanding both what EN is and what its scope might be. A twenty-first-century vision for neuroscience is one in which discoveries in neuroscience help contribute to human flourishing, broadly conceived.

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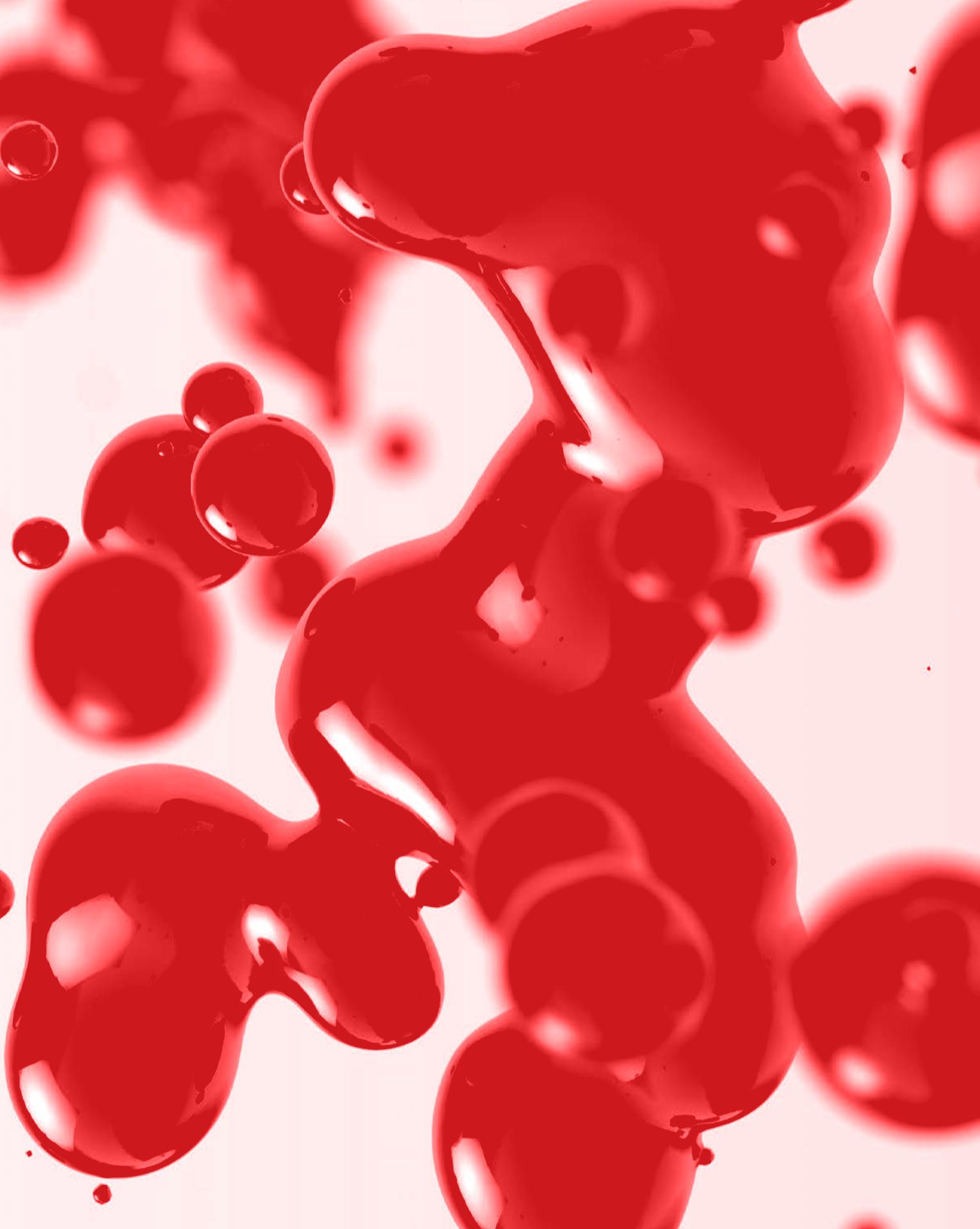
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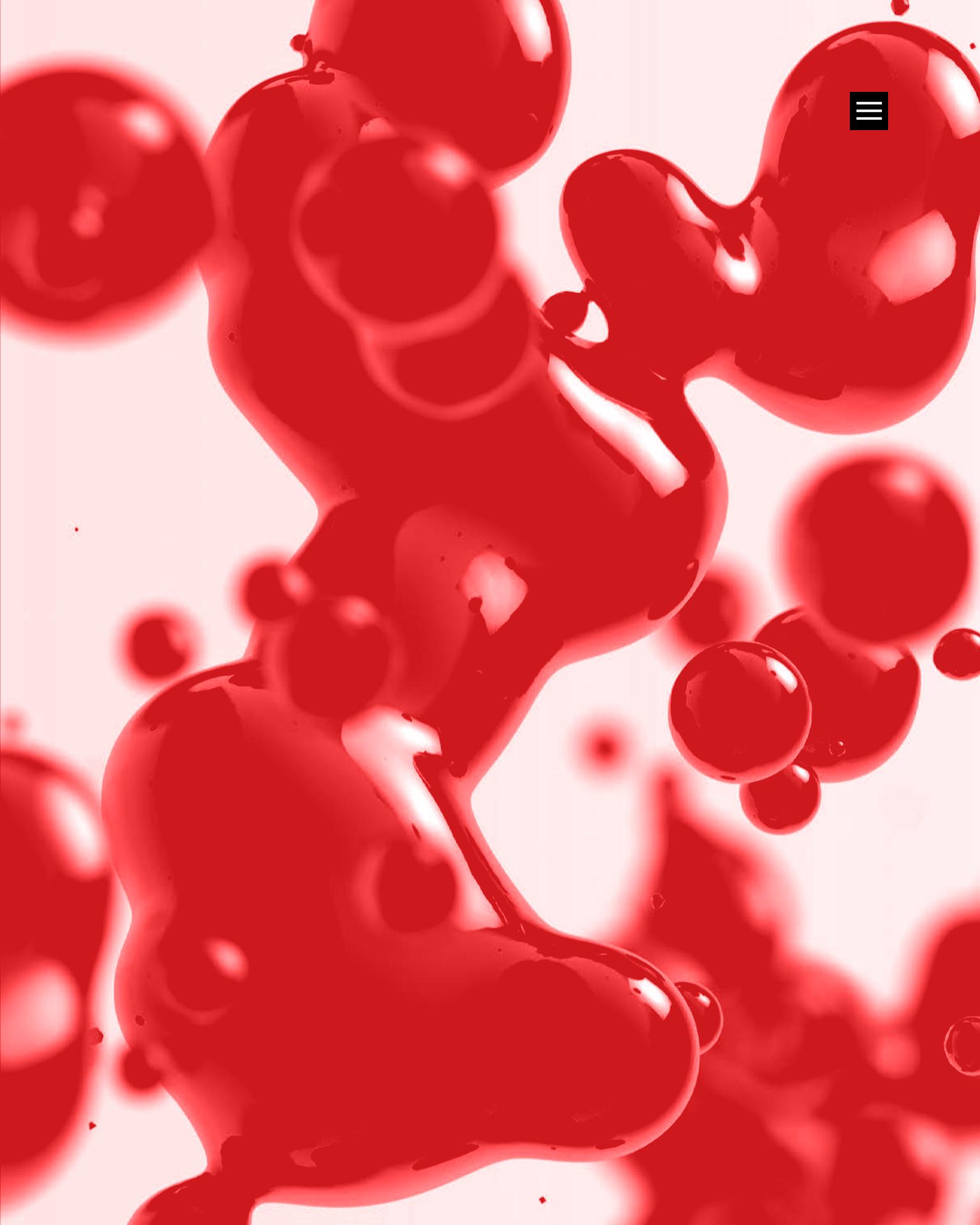
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C H A P T E R

8

Curriculum and pedagogy in a changing world

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This chapter explores the evolving nature of curriculum and pedagogy in a rapidly changing world. It argues that curriculum is not, and should not be, a clearly delineated concept that can be applied uniformly across different systems of education. Rather, it should be dynamic, evolving and contextual, representing specific historical and political forces and actors. To capture some of this contextual diversity, the chapter provides an evidence-informed assessment of current trends in the curriculum and pedagogy fields. It outlines the different histories and traditions of curriculum and pedagogy, noting how the many ways education has been conceived and practised leave ongoing legacies. Some of the trends and challenges confronting contemporary curriculum and pedagogy are outlined, including (neo)colonialism, economism and neoliberalism, technologization of learning and educational neuroscience. The chapter recommends some approaches to hybrid learning ecologies and the increased need for opening up spaces for emotions and ‘being’ in education.

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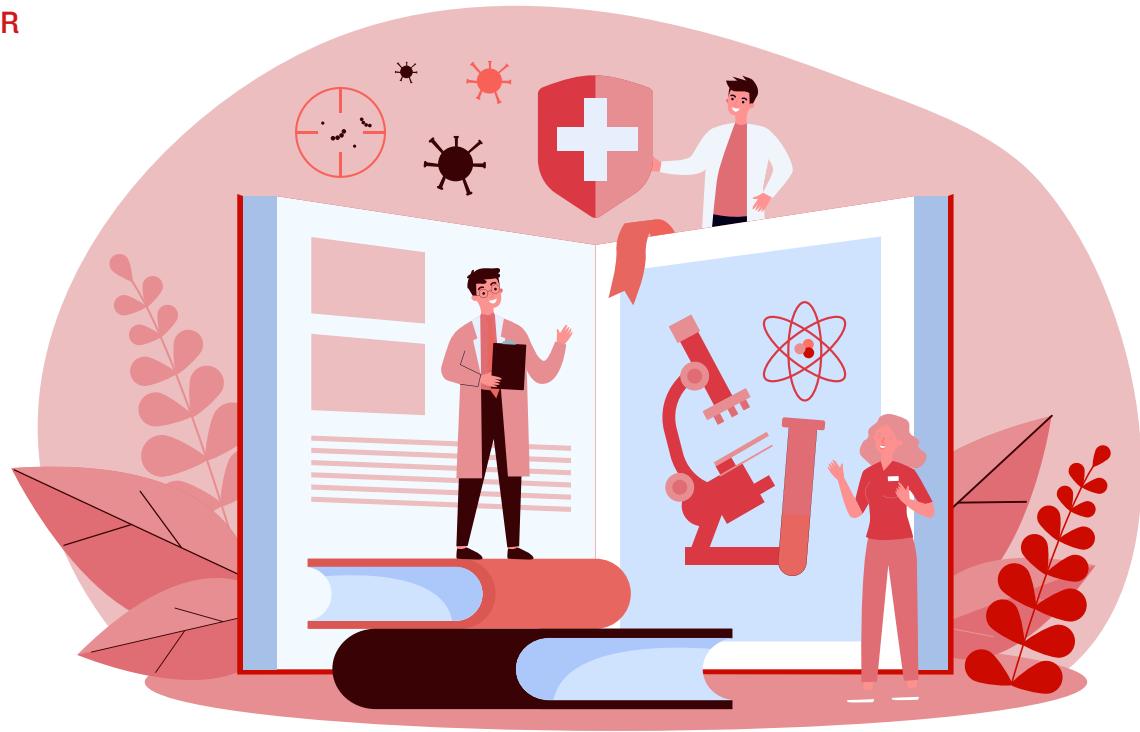
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8.1

Curriculum as conversation

Curriculum, crudely speaking, constitutes the ‘content’ of education. But what does this content actually consist of? In much contemporary educational debate, curriculum is taken to be essentially monolithic (i.e. subject to only marginal differences across cultural or social boundaries)

and inherently positive (aimed at nurturing productive, fulfilled and socially well-adapted workers and citizens). The questions posed by policy-making and commercial elites, and which inform the work of multilateral bodies such as the OECD, are therefore typically of the ‘how’ rather than the ‘what’



What gets taught, why, and on whose authority are therefore absolutely central questions that any analysis of the relationship between education and ‘context’ must address.

variety. Assuming that education is a necessary and desirable ‘good’, they focus primarily on how it can be delivered more effectively and efficiently (and how effective delivery can be verified through testing – see **WG2-ch9** on assessment). And what is wrong with this? Can we not all agree that education is, generally speaking, a ‘good thing’?

This chapter demonstrates that the view of education as inherently good is far too glib and simplistic (this was also noted in the discussion of conflict and education in **WG2-ch5**). Even the most superficial reflection on recent human history should remind us that education has often been a powerfully destructive force – fomenting division, fostering hatred, fuelling conflict, and promoting a profoundly unsustainable relationship between humanity and the natural environment. And this remains true of societies across the world today. What gets taught, why, and on whose authority are therefore absolutely central questions that any analysis of the relationship

between education and ‘context’ must address (see also **WG2-ch9, ch5**).

In dominant Western traditions, attempts to define curriculum have emphasized ‘content’ and ‘objectives’ to be efficiently and effectively implemented by teachers using assessment to ensure learning. Across much of postcolonial Asia and Africa, it has come to be equated with examination ‘syllabuses’ and related state-mandated ‘standards’ or ‘guidelines’ (**UNESCO MGIEP, 2017**). The historic domination of the syllabus as a rigid plan of teaching is discussed by Dottrens (1962), who suggests that the main objective of the syllabus is mastery of facts, which is usually binding on teachers who are not authorized or equipped to do more than adapt the content to local circumstances. In this sense, the main objective of curriculum concerns the acquisition of habits, skills, facts and attitudes that presumably will determine how children behave (**Dottrens, 1962, p. 82**). While curriculum categories such as implementation,

... curriculum can be characterized as dynamic, evolving and contextual, representing specific historical and political forces and actors.

dissemination and null curriculum (what schools do not teach) have traditionally been topics of curriculum discussion (**Taba, 1962; Marsh and Willis, 2007; Tyler, 2013**), and the above ‘top-down’ conceptualization of curriculum remains widespread today, this conceptualization is increasingly being challenged – (see **Rocha, 2020**) – a critique to which this chapter seeks to contribute.

The premise of this chapter is that curriculum is not a clearly delineated concept that can be applied uniformly across different systems of education. Viewed as such, curriculum can be characterized as dynamic, evolving and contextual, representing specific historical and political forces and actors. Originating over 30 years ago, the concept of the curriculum conversation has recently been reframed by some scholars as a ‘complicated conversation’ among teachers, researchers, students, parents, politicians and commercial actors like textbook publishers (**Pinar, 2019**). This complicated conversation can be decoded as

what older generations choose to tell children about the world – its past, present, future (socialization) – and also what is needed for children to autonomously unfold and become in the world (subjectification), including those qualities and capacities they will need to function well in both their personal and professional lives (qualification). Given its centrality in schooling, but also as a result of differences in what kind of socialization, subjectification and qualification is deemed desirable, curricula are inevitably contested, accompanied by acrimonious debates, nested in politics and ideology and ideas about learning (**Biesta, 2010**). By conceptualizing curriculum and pedagogy as a ‘complicated conversation’ in this chapter, we acknowledge the vast diversity of ethical and political perspectives that inform processes of curriculum development in different contexts, and hence the impossibility of reducing any discussion of curriculum simply to questions of ‘efficiency’ or ‘effectiveness’.



Curriculum and pedagogy cannot be meaningfully discussed without attending to their historical, cultural and ideological underpinnings and the sometimes volatile political settings in which they are shaped.

If we view curriculum as a ‘complicated conversation’, then we can understand the syllabus as the start of this conversation, though at the same time the syllabus itself is the product of negotiations around ideology, planning and resource allocation; in truth, the conversation is never-ending. From the perspective of most teachers, however, the syllabus typically constitutes the starting point for conversation concerning the curriculum – a conversation manifested in pedagogical practice within the classroom. Pedagogy can be conceived of as the arrangements of spaces, actions, conduits and levers that are employed by teachers to structure this conversation, but it, too, is shaped by political, cultural and policy influences, and in many countries, by the legacies of organized religion, colonialism, imperialism and political ideologies such as fascism and communism (Alexander, 2000). As the primary participants in this conversation, educators employ a wide range of pedagogical practices, often localized according to culture,

informed by research, political ideology and even by idiosyncratic preferences. The intellectual independence of teachers – what is often termed ‘academic freedom’ – can be key in making crucial curriculum decisions and choosing appropriate pedagogical practices, but educators are inevitably influenced by their circumstances. Curriculum and pedagogy cannot be meaningfully discussed without attending to their historical, cultural and ideological underpinnings and the sometimes volatile political settings in which they are shaped.

As this chapter illustrates, the curriculum as ‘complicated conversation’ takes different forms depending on local and national contexts. Some scholars emphasize neocolonization, for example, in present-day China, where mainstream Han culture is being enforced on minority populations (Leibold and Grose, 2019). Other scholars highlight the power of neoliberalism in dictating national curricula and forms of assessment (Apple, 1979). We will come back to these different lenses later in

... curriculum and pedagogy should be conceived as a conversation involving different stakeholders with various ideologies and motivations.

this chapter, but for now it is enough to note that there are tensions between the imported and locally enforced instrumental views of curriculum and the localized, sometimes indigenous, ways of knowing that are more relational (e.g. intergenerational) and situated (e.g. place-based). In many parts of the world, the idea of what might be called a situated ‘living curriculum’ has been lost or marginalized. In the quest for more sustainable ways of living there have been efforts to revive or regenerate some of these more embedded ways of knowing, including in countries that colonized other countries. It should, however, be remembered that ‘indigenous’ approaches are not necessarily ‘good’; the sanction of tradition can embed an oppressive, hierarchical social order.

To represent a wide range of voices in this complicated conversation, the coordinating lead authors of this chapter invited academics and practitioners from different regions worldwide to contribute to our understanding

of curriculum and pedagogy and delineate the forces that have been shaping them. The discussion incorporates both general and more localized, contextualized empirical and conceptual studies that have informed reflections and scholarly insight on curriculum and pedagogy (Dion, 2009).

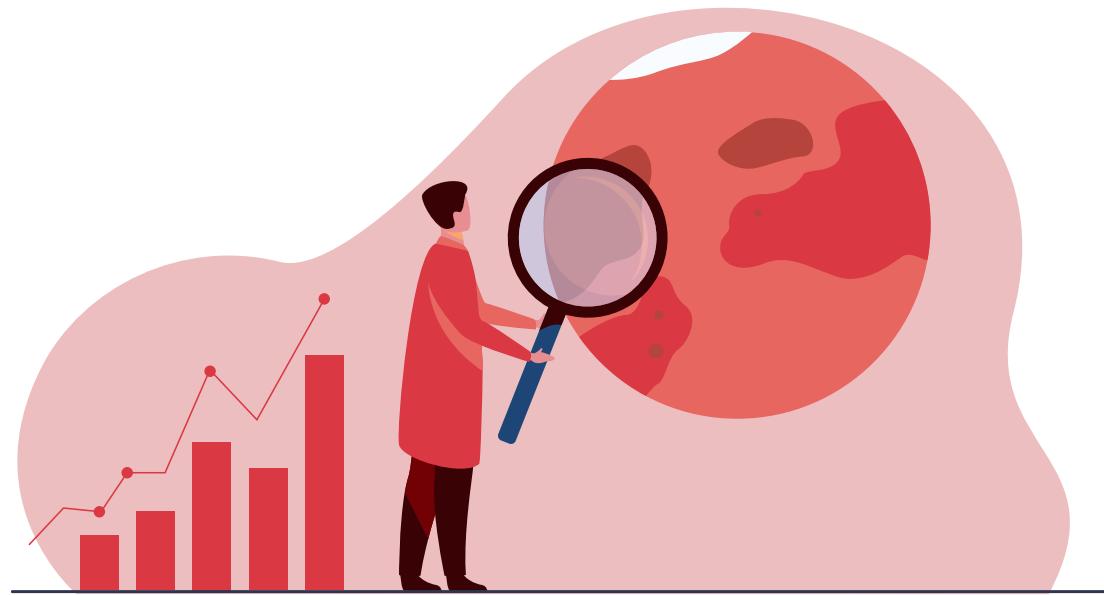
Methodologically speaking then, this chapter engages with diverse contributions to provide an evidence-informed assessment of current trends in the curriculum and pedagogy fields, but it should not be considered a systematic review of the literature. With grey literature (such as websites) included so as to provide the most up-to-date information, and publications in the native languages of some contributors, this chapter attempts a more inclusive and participatory approach, rather than defaulting to a conventional, Anglocentric analysis.

This chapter argues that curriculum and pedagogy should be conceived as a conversation involving different stakeholders with various ideologies and



motivations. As the scope of this chapter is predominantly the school sector, we argue for this conversation to take a normative turn towards sustainability, which can be focused around the themes of the Sustainable Development Goals (SDGs). The means to sustainability through education is formed through inculcating qualities conducive to active, engaged, democratic citizenship,

encouraging students to critique and challenge the status quo and transform society towards the goals of sustainability. While these insights may resonate with readers, they are not meant to be universally applicable or lead to prescriptions. Rather, in line with a key premise of this chapter, they are intended to open up conversations that can inform, question and encourage localized



8.2

Histories and traditions

In every continent there are distinctive conceptions of what students study and what teachers teach, and they have distinctive and often complex histories: Bildung in Europe (Horlacher, 2015), Conscientization in Latin America (Freire, 1970), Currere in North America (Pinar, 2011), Ke-Cheng in China (Zhang, 2008), and

Ubuntu in Africa (Le Grange, 2012). These and other conceptions are both localized – recontextualized by region and country – and internationalized. Importantly, these concepts do not circulate uncontested; often they provoke conflict and contention, as well as reconceptualization. For example, ‘deliberation’, associated with the



Pedagogy became the language that talked back to the global deployment of curriculum as promoted by international agencies like UNESCO.

American curriculum theorist Joseph Schwab, was redefined in India by Krishna Kumar (**Chacko, 2015**), recast as Jewish by Alan Block (**2004**), and introduced in Chinese curriculum reform (**Xu, 1995, 2009**). John Dewey's pragmatic curriculum theory continues to be invoked in educational debate across East Asia and elsewhere (**Zhang, 2014, p. 38**). Soviet educational thought was (and remains) hugely influential in China, though it is a legacy that has been contested (**Zhang, 2014, p. 46**). Marxist thought has been influential in Cuba and the Caribbean (**Kane, 2013; Massón Cruz, 2015**) and, earlier, in North America (**Giroux, 1981; Apple, 1996; McLaren, 2005**). Still influential worldwide are Montessori, Gandhi and Tagore who offered perspectives on education as a response to the culture of war that had plagued the world in the first half of the twentieth century (**Prasad, 2005**). They reconceptualized knowledge, pedagogy and the aims of education as part of a critique of what they considered detrimental mechanistic, instrumentalist and

'dehumanizing' approaches to schooling, whereby standardized testing and the collection of data are placed before the development of the child (**Wang, 2014; Batra, 2015**).

Across many newly industrialized countries with long histories of colonialism (crudely referred to as the Global South), debate over what should be valued as curricular knowledge, or how a state-mandated curriculum should be negotiated by teachers and learners, has often been acutely political. In Latin America, curriculum and pedagogy are understood as traditions that collided when the field of curriculum arrived in the region in the 1950s. Pedagogy became the language that talked back to the global deployment of curriculum as promoted by international agencies like UNESCO. This global deployment was critiqued by several Latin American curriculum scholars as a form of 'acculturation' (**García-Garduño, 2011**), specifically the forced importation of 'U.S. industrial pedagogy' (**Díaz-Barriga, 1984**) and

the beginning of the hegemony of ‘educational technology’ (**Magendzo, Abraham and Lavín, 2014**). The common understanding of these scholars seems to be that before this forced importation ‘the traits of a view of education based on efficiency and productivity were absent’ (**Díaz-Barriga and García-Garduño, 2014, p. 11**). Countering this global deployment of standardized curricula as culturally monologic was a pedagogy of listening, a pedagogy of liberation based on dialogical encounter (**Freire, 1965**), and a pedagogy of waiting for the Other’s often inexpressible revelation (**Dussel, 1976**).

Across much of Africa, meanwhile, the legacies of colonialism and conflict have fomented a distrust in deliberative democratic action. In (South) Africa, the Council on Higher Education (**CHE, 2016**) noted that after two decades of postapartheid democracy, openness, mutual trust, and critical engagement among academics and students in the country’s universities was sorely lacking. This is especially

disconcerting in the light of intensifying demands from African scholars, educators and politicians for the ‘decolonization’ of school and university curricula. In a variation of the traditional notion of Ubuntu, some have invoked the notion of Cosmo-Ubuntu (**Cossa, 2018**) to advance the practice of a ‘living’ pedagogy and curriculum in Africa. The notion of Cosmo-Ubuntu – derived from cosmopolitanism and Ubuntu – is constituted by two aspects of human experience: firstly, that all humans are inherently considered as cosmopolitan beings whereby they openly and reflexively examine their own practices in relation to those of others to the extent that they might be altered on the grounds of their critical engagement with otherness; and secondly, that they recognize their autonomy and interdependence towards that which is still in becoming (**Waghid, 2020**).

In Africa, and in many parts of Asia, curricular representations of values and identities often take pains to differentiate a collective national ‘self’ from a Western



‘other’. In China, in recent decades, the Chinese Communist Party (CCP) has increasingly sought to associate itself with the glories of ancient China, celebrating ‘tradition’ rather than preaching a radical break with the past (as it did under Mao). This celebration of ‘China’s superior traditional culture’ has intensified under the presidency of Xi Jinping, as the country has also sought to claim a more influential global role. The desire to promote Chinese leadership, while asserting Chinese exceptionalism, extends to rhetoric on climate change, especially in talk of ‘ecological civilisation’. This represents ‘harmonious’ unity between man and nature as essential to Chinese culture, distinguishing it from an instrumentalist, exploitative ‘Western’ approach to the environment. In doing so, it ties idealization of China’s ancient philosophical heritage to a vision of ‘a new kind of Communist Party led utopia’ (**Hansen, Li and Svarverud, 2018, p. 195**).

The attempt to draw a stark contrast between Chinese ‘harmony’ with nature and rapacious ‘Western modernity’ draws upon and is echoed by some Western postcolonialist scholarship, which similarly pits Western exploitation against non-Western solicitude for the natural world (see **Silova, Komatsu and Rappleye, 2018; Vickers, 2018**). However, research on China’s environmental history has yielded no evidence to support such a dichotomy (**Elvin, 2004**), while China today is the world’s largest emitter of greenhouse gases. Hansen, Li and Svarverud (**2018, p. 202**) conclude that the concept of eco-civilization ‘implies no ecological revolution’ and ‘largely ignores the environmental risks inherent in continued global growth dependency’. The discourse of ‘ecological civilization’, propagated through schooling and the media, may have contributed to raising environmental consciousness among the Chinese population, but it does so in service of the larger cause of the ‘great revival of the Chinese nation’ and the

Crucial among the influences that continue to shape curricular discourse in societies around the world are experiences of colonialism.

legitimation of CCP rule.

The foregoing examples demonstrate that there can be no simple binary between North and South or East and West, that as curriculum concepts circulate worldwide, they are appropriated locally, then recast according to local cultures, politics and policies. Crucial among the influences that continue to shape curricular discourse in societies around the world are experiences of colonialism (as perpetrator, victim, or both); legacies of conflict; nation-building agendas (often especially powerful and explicit in newly independent states); and culture or tradition (as interpreted by dominant vested interests) (Pherali, 2016). Idealistic visions of education as a vehicle for collective and personal liberation, individual fulfilment, and the promotion of peace and sustainability have occasionally been invoked in curricular debate. But the history of national education systems demonstrates the inescapable centrality of politics in shaping both curricular content and state-mandated models for pedagogical

practice (Green, 1990; Alexander, 2000).

8.2 .1

CURRICULUM AS A PROFESSIONAL FIELD

Politics is the story of power, and the power to define and shape curricula has been distributed in different ways in different societies at different times. In societies where educational studies (or pedagogics) have established themselves as a more or less autonomous professional field, as in much of Europe and North America, teacher training has involved induction into a tradition of practice and inquiry that often stands in tension with the educational agenda of the national authorities. In liberal democracies, curriculum frequently emerges as a battleground hotly contested by politicians and professional educators with a strong sense of their own identity and vocation. But in many other societies,



Politics is the story of power, and the power to define and shape curricula has been distributed in different ways in different societies at different times.

including those whose educational institutions were bequeathed by colonial rulers or a similarly authoritarian state apparatus, government maintains a strong grip over curriculum development, and educational practitioners are treated as foot-soldiers tasked with implementing a central curricular design, rather than partners with expertise, to be consulted and involved in preparing that plan in the first place (on China, see Wilson et al., 2016; on South Asia, see Sharma, 2020). Such ‘vertical’ patterns of curricular control contrast with more horizontally organized systems, such as that of Finland (Pietarinen, Pyhältö and Soini, 2017) in which the influence of an autonomous and cohesive community of professional educators is strongly institutionalized.

Theoretical issues that have informed curricular inquiry over recent years include the state of the ‘individual’; the recurring question of the human subject; the pervasive influence of neoliberalism; the increasingly contentious and complex question of technology;

gender; the marginalization and alienation of minorities (of various kinds) (Apple, 1979, 1993); concerns to resolve or prevent conflict (see WG2-ch5); quality issues (Kumar and Sarangapani, 2004); and the urgency of sustainability. Contemporary scholarly efforts to understand curriculum often emphasize history, culture, race, poverty, gender, social justice and sustainability – topics to be outlined later in the chapter. There has been considerable discussion of the often-forced alignment of curriculum with desired social, environmental and economic outcomes, with some scholars questioning the capacity of the curriculum to change the world, suggesting that studying ‘emergencies of the moment’ – climate change, racism, misogyny, right-wing populism, pandemics, mass migration – are justified ethically and pragmatically, in a Deweyan-sense, but not instrumentally (Van Poeck et al., 2015).

Since the 1980s, issues of curriculum and assessment (see WG2-ch9) have increasingly been debated in managerialist terms,

on the basis of fundamentally economicistic conceptions of the purpose of education. A discourse of ‘accountability’ has been associated with intensifying efforts to measure educational ‘outputs’, with implications for the kind of curricular knowledge and skills deemed worthy of being taught (**Alexander, 2000**). Efforts to develop international benchmarks and standardized educational performance and efficiency indicators led to the development of the Programme for International Student Assessment (PISA)/OECD rankings which, in turn, have driven a culture of performativity and accountability into curriculum and pedagogy, effectively marginalizing the original intent of education (**Biesta, 2009**). As a result, curriculum risked being reduced to content and textbooks, often closely connected to disciplinary school subjects, especially the sciences, delineating clear and measurable learning outcomes and developing adequate tests and tools to maximize ‘uptake’. Likewise, pedagogy has often been confined to effective knowledge

transfer. The professional field became closely connected to subject-matter didactics, learning and instruction, educational measurement, and governmental or commercial entities such as textbook publishers, educational measurement outfits, and supranational agencies such as the OECD (PISA), management consultants such as McKinsey, and large United Kingdom (UK)- and United States (USA) based multinational educational publishers such as Pearson or Thomson Learning.

In many countries, curriculum development has become synonymous with content determination and ‘didactization’ (determining the best way to teach that content). It is often dominated by public, semi-private or private textbook publishing companies, and textbook reform continues to remain a major agenda for political ideologues and serious educationists. The resulting curriculum can be frozen or fine-tuned for five to ten years or even longer before a curriculum revision takes place, prompting new editions of old



There are also countries where curriculum development is viewed as an interactive process involving teachers, policy-makers, curriculum developers and content experts that takes place periodically at the national level.

textbooks (e.g. Ornstein, 1994). Ministries of education set content agendas and often collaborate with national institutes in curriculum development, institutions that in turn collaborate with textbook publishers. Depending on sociocultural histories and prevailing governance structures, the pedagogical, learning and instruction elements have been left to schools themselves or are often prescribed in the form of teacher guidebooks and teachers' in-service training. Frequent teacher-training programmes have become an integral part of curriculum processes, often leading to contradictory perspectives being prescribed to the teachers every fifth or tenth year when the curriculum is changed or 'reformed'. In countries where critical discussion is possible, there has been resistance to prescriptive tendencies, as they impede the freedom to learn and the possibility to make education more open, responsive and relational (Giroux, 1983; Crocco and Costigan, 2007). There are also countries, for instance Finland and The Netherlands, where

curriculum development is viewed as an interactive process involving teachers, policy-makers, curriculum developers and content experts that takes place periodically at the national level (Kuiper, Nieveen and Berkvens, 2013; Pietarinen, Pyhältö and Soini, 2017). In a way this is a formalized participatory conversation that leads to some kind of consensus about what needs to be taught in the coming years (see, e.g., Ben-Perez, 1980). On the other end of the prescribed spectrum, we find independent schools and more localized or contextualized forms of curriculum, one memorable instance of which was the Eight-Year Study (Pinar, 2011). These different manifestations of curriculum development from prescribed, centralized and national towards self-determined, de-centralized and localized, bookend what takes place in schools and what knowledge is considered of most worth, and how curriculum is conceived of as a professional field. At one end of the spectrum is a more policy-driven, universal and fixed curriculum, where teachers



8.3

Power, resistance and the politics of curricular and pedagogical changes

There is a wide range of interrelated trends and challenges that sometimes slowly, sometimes abruptly, fundamentally affect curriculum and pedagogy. While these can be named and

distinguished from one another, in practice they are often mixed and inseparable. They include, but are not limited to: (de) globalization; neoimperialism; economism (neoliberalism);



'Critical thinking', 'creativity' and the role of humanities in promoting cosmopolitanism are frequently invoked as objectives in curriculum documents around the world, but these notions are interpreted in widely differing ways.

economic inequality; gender; marginalization of indigenous or minority communities; mass migration; political polarization (and right-wing populism); violence; technologization; the climate crisis and pandemics; and a range of 'isms' including racism, anti-Semitism, homophobia, Islamophobia, sexism and species-ism. Below are some of the differing conceptual lenses through which the changing role of curriculum and pedagogy can be viewed.

8.3 .1

POWER AND POLITICS

The lens of neoimperialism and associated authoritarianism (**even fascism, see Thomas and Eley, 2020**), nationalism, populism, colonialism (**including data colonialism, see Couldry and Mejias, 2019**), patriarchy and its structuration of gender, religious fundamentalism, tends to convert education into indoctrination,

undermining democratic processes in schools and classrooms, and marginalizing and deforming certain groups in society. These trends also raise questions regarding the place and meaning of critical thinking in education. 'Critical thinking', 'creativity' and the role of humanities in promoting cosmopolitanism (or 'international understanding') are frequently invoked as objectives in curriculum documents around the world, but these notions are interpreted in widely differing ways. In policy-making circles in China and East Asia, for instance, critical thinking is often considered 'instrumentally', for example, as a skill, rather than an ethically or politically desirable quality necessary for nurturing active, engaged, democratic citizens. In other words, in some contexts, critical thinking has been promoted by policy-makers for its role in boosting 'competitiveness' in the 'global knowledge economy', even while many of the same policy-makers call for an enhanced curricular focus on (uncritical) patriotic education that promotes ethnocultural or

Despite many pedagogical reforms that emphasize education for self-reliance and critical citizenship, colonial world views still dominate curricular and pedagogical practices.

religious chauvinism (**UNESCO MGIEP, 2017, chapter 3; Vickers and Zhang, 2017**).

An example of continued colonial legacies in education comes from formerly occupied countries, such as India, Brazil and African countries, where the language and structures introduced during colonial rule remained intact in education. Although most African countries gained independence in the second half of the twentieth century, there remains a ‘colonial matrix of power’ (**Grosfoguel, 2013**) that is reproduced through curriculum and pedagogy. Most African countries use the languages of the former colonial powers (predominantly English or French) as the medium of instruction in schools (**Obondo, 2007**). In many societies, this practice has tended to perpetuate the attitudes, norms and identities of the colonial powers at the expense of those of the indigenous people, with elite status continuing to be associated with command of the language of the former colonizers. While this has certainly exacerbated inequality

and the widespread erosion of local traditions and customs, the situation is complicated by the fact that it is often popular demand that reinforces or enhances the status of the former colonial language in the postcolonial era. In Hong Kong, for example, English has endured after 1997 thanks to its status as the dominant international language, and continues to be viewed as an essential component of a multilingual strategy that emphasizes Cantonese and Mandarin as the local and national languages. Despite consistent calls from the educational establishment in the last two decades of colonial rule for mother tongue (Cantonese/Chinese) instruction to become the default approach in local schools, local public opinion was vehemently opposed to any reduction in the availability of English-medium instruction (**Sweeting and Vickers, 2007**).

The systematic hegemony of European languages through curriculum and pedagogy perpetuates coloniality – the



In postcolonial societies, as elsewhere, curriculum frequently becomes a field of contestation between nationalistic goals, corporate vested interests associated with globalization, and other interests and agendas.

quality of being colonial – entrenching a sense of dependence, while depleting indigenous communities' social capital, which refers to stocks of social trust, and other norms that promote social justice, equality and human decency (**Potter, 2003**). Despite many pedagogical reforms that emphasize education for self-reliance and critical citizenship (**Rwanda Ministry of Education, 2018**), colonial world views still dominate curricular and pedagogical practices. In Africa and parts of Asia, a wave has emerged in curriculum plans that attempts to confront coloniality with decolonial alternatives. Decolonial alternatives constitute a premise on which critical citizenship develops, as citizenship education 'should help students acquire democratic values within an educational context that respects and reflects their community cultures, languages, hopes, and dreams' (**Banks, 2007, p. 1**). The impetus for renewed interest in a decolonized curriculum in South Africa comes from recent student protests (**Disemelo, 2015**), whereby Le Grange (**2019**) argues

that a decolonized curriculum is necessary for the following mutually inclusive reasons: to seek cognitive justice; to debunk the illusion that Eurocentric knowledge is universal; to redress the fact that colonization reduced the knowledges of the Global South to culture; the psychosocial transformation of the colonized; and challenging the fact that African schools and universities are based on Western models of academic organization.

However, calls for 'decolonization' can also provide an opening or cover for the promotion of nationalistic or chauvinistic political agendas. In postcolonial societies, as elsewhere, curriculum frequently becomes a field of contestation between nationalistic goals, corporate vested interests associated with globalization, and other interests and agendas. The curriculum framework documents of India, Pakistan and Uganda illustrate the complexity of curricula as sites of complex, interlocking conflicts. The resistance to a colonial frame has implied 'thinking

There are African countries, like Zambia, where there have been attempts to ground curriculum and pedagogy in local communities and traditions where, ideally, students' hopes, fears and ideas are communicated in their own language and their own norms of life.

and acting locally, decentering knowledge production and validation, emphasizing affection, relations and subjectivities, cherishing community, plurality and collaboration, submitting to other worldviews' (**Borelli, Silvestre and Pessoa, 2020, p. 303**). This also requires embracing indigenous languages in which various forms of plurality and subjectivity are expressed, but such aspirations often run up against the challenge that school-level and higher knowledge has yet to be articulated in these languages. Therefore, many curricular plans, such as local language being the medium of instruction, remain unactualized.

Decolonization of curricula involves a range of possibilities: (1) a radical rethinking of Western disciplines, so that curriculum and pedagogy recognize the pain and anguish experienced by colonized peoples; (2) the development of transdisciplinary knowledge, based on a socially distributed knowledge system that includes indigenous communities; (3) the development and design of

local curricula featuring new knowledge spaces where Western knowledge is decentred and equitably compared and functions alongside indigenous knowledges; (4) encouragement of students to learn about the epistemologies that emerged from the Cradle of Humankind that Nabudere (2011) refers to as Afrikology; and (5) engagement in a process of unlearning in order to relearn (Carvalho, De Carvalho and Flórez-Flórez, 2014). There are African countries, like Zambia (**Namafé and Chileshe, 2013**), where there have been attempts to ground curriculum and pedagogy in local communities and traditions where, ideally, students' hopes, fears and ideas are communicated in their own language and their own norms of life.

However, a thoroughgoing liberation of the curriculum from subordination to state goals – as distinct from substitution of homegrown oppression for 'alien' colonial hegemony – remains an elusive goal. Enabling teachers and educational institutions to exercise autonomy in their curricular



One manifestation of the influence of prevailing economism and neoliberalism on curriculum can be found in national and international comparative forms of summative assessment.

planning, striking a viable balance between official oversight, the promotion of teachers' professionalism and sensitivity to the local socio-economic context, involves a complex and challenging balancing act in any society. This is especially so when capacity, in the form of a workforce of trained educators or the means to develop one, simply does not exist at the sub-national level. That absence in turn easily becomes an excuse for maintaining the overbearing command and control functions of a centralized educational bureaucracy, thus ensuring that the development of autonomous local capacity remains stunted. Breaking that vicious cycle is a challenge that demands political intervention.

8.3 .2

ECONOMISM AND NEOLIBERALISM

One manifestation of the influence of prevailing economism

and neoliberalism on curriculum can be found in national and international comparative forms of summative assessment. A prominent example of the latter is the PISA/OECD transnational measurement of 'outcomes'. The resort to metrics is also related to efforts to de-politicize debate over curriculum, suppressing discussion of politics and ideology while portraying teaching and learning as processes to be informed by insights based on 'science', 'evidence' and (technical) 'efficiency' (see **WG2-ch9**). Evident are tensions between 'scientism' and 'economism' in educational debates and the linked discourses of 'skills' and skillification of education, and the erosion of the arts and the humanities in education (**Nussbaum, 2010**). Crudely put, this contrast between economism and humanism in envisioning the aims of education corresponds to the fundamentally human capital-based orientation of the OECD on the one hand, and the more traditional humanistic approach of UNESCO on the other – though this distinction

The ‘backwash effect’ of performance metrics introduced in the name of accountability is evident in curricula at every level from kindergarten to university.

has become more blurred in the early twenty-first century. One outcome of the growing traction of an economicistic, marketized, neoliberal outlook in national education policy debates has been the rise of private education across the globe, including in the Global South, and the detrimental side effects in some African countries of universal primary education (*Moussa and Omoeva, 2020*).

The ‘backwash effect’ of performance metrics introduced in the name of accountability is evident in curricula at every level from kindergarten to university, as educators and institutions are incentivized to focus their teaching on ‘what gets measured’. In Malaysia, for example, universities find their capacity for autonomous planning constrained by key performance indicators (KPIs) imposed by various authorities and agencies (*Universiti Sains Malaysia, 2010*). The emphasis on intangibles and immeasurables – key intangible performance (KIP) – has been weakened by demands to fulfil KPIs and other measurable indicators in an oversimplified and naïve manner. This includes

citation count and number of publications in particular types of journals, commonly used to tabulate university rankings. An alternative KIP approach, proposed by local academics, would involve the use of a specially designed Competency Framework (*Dzulkifli and Afendras, 2014*), avoiding a ‘ticked box’ exercise to which the institution is expected to conform. In its place, various ‘accountability’ formats related to KIP, such as story-telling and visual presentations, are accepted. In conjunction with project partners, this provides a 360-degree approach based on a range of stated domains. No academic ‘grades’ are assigned, but instead a competency assessment of the level of outcomes attained is given (*Dzulkifli and Afendras, 2014; Dzulkifli, 2018*). It attempts to ‘gauge’ the behavioural change in students after they have learnt to apply knowledge acquired to achieve the desired impact collectively, rather than what an individual can retain and do (*IIUM, no date; Dzulkifli and Borhan, 2019*). Students may be assessed on attributes such as teamwork, commitment



and empathy, amongst other factors. This approach, piloted at the International Islamic University Malaysia (IIUM), aspires to transcend a reductively quantitative approach to ‘accountability’, with its narrowing and deadening effects on curriculum and pedagogy. But whether state bureaucracies and policy-making elites will prove ready to sanction the wider use of an approach that erodes their power over educational institutions remains an open question.

Another example of the influence of economism and neoliberalism as a driver of education comes from Latin America where 1990s education reforms, influenced by key UNESCO reports (e.g. **UNESCO, 1990**), redirected much of the education budget to elementary schooling, while defunding and restricting access to higher levels of education (**Accioly, Gawryszewski and Nascimento, 2016**). While these policies were portrayed as progressive measures, one effect was to raise barriers for poorer students seeking to access higher education, while having no effect

on access for wealthier students, who can afford to attend fee-paying private institutions. In Brazil, where secondary education became compulsory only in 2013, standardized test results have been invoked to strengthen arguments for implementing secondary education curriculum reform based on core ‘competencies’, decreasing instructional time spent on certain subject matter (e.g. in subjects such as social studies or the arts that are less susceptible to measurement), and emphasizing the development of behavioural ‘skills’ (**Jones and Moore, 1993; Duarte, 2003; Berliner, 2011; de Andrade and da Motta, 2020**). Such ‘reforms’ have been associated with the militarization of schools (**de Freitas, 2018**) and restriction of the possibilities for critical education.

8.3 .3

TECHNOLOGIZATION OF LEARNING

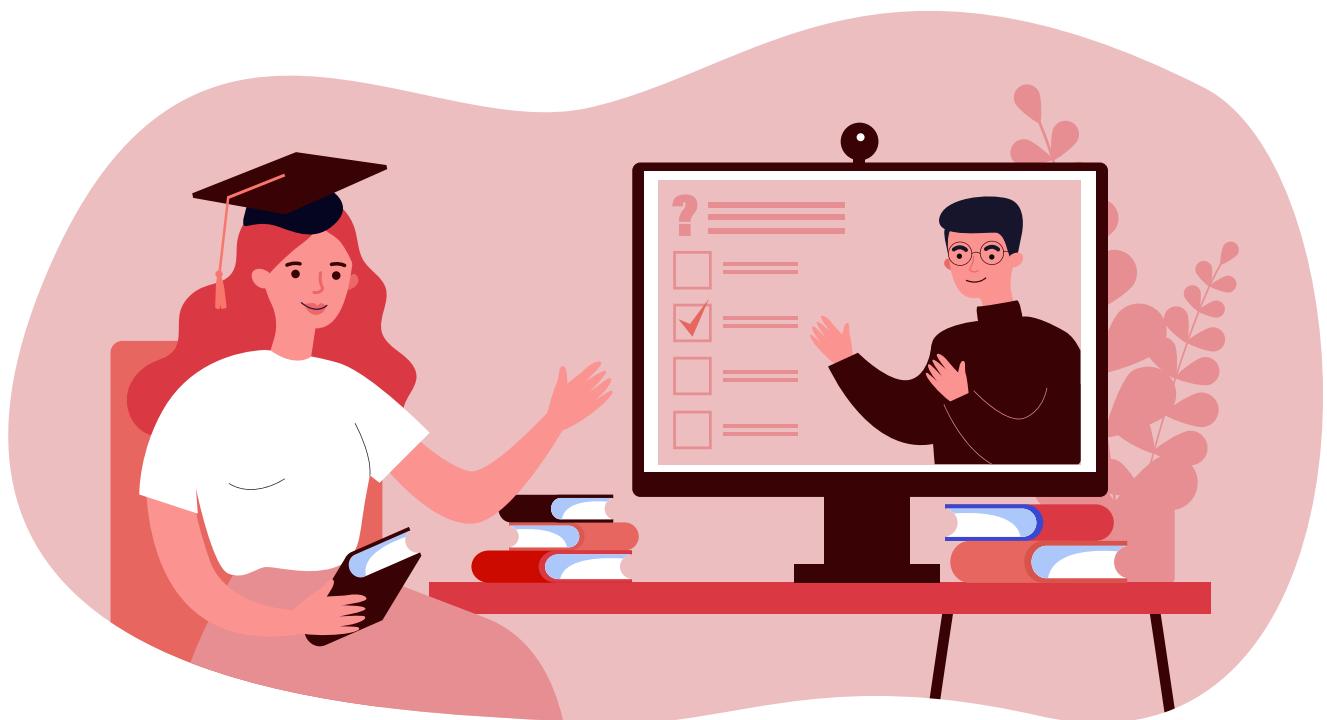
It is perhaps not coincidental that some of the loudest and most

persistent calls for a sweeping introduction of digital technology into classrooms and the wider learning process has come from exponents of a strongly human capital-oriented, instrumental vision of education, such as the OECD. While increased dependency on technology-mediated learning experiences can be viewed as both a blessing and a curse for education (as the COVID-19 pandemic has demonstrated), it can also distort the learning process, hijacking students' attention, while funnelling profits to high-tech companies (whose tax avoidance often depletes public funding for education), fuelling the rise of powerful, unaccountable corporate actors in educational policy-making and curriculum development. What some view as the fetishization of 'EdTech' can be closely related to the dominance of scientism and economism in educational debates (see Chapter 6 for more on EdTech).

Interestingly, in relation to the intensifying backlash against online learning, recent community

based research and learning in Colombia has shown the potential of information and communications technologies to facilitate intercultural dialogue and learning between diverse grassroots communities and students of higher education (Macintyre et al., 2020). With more and more learning moving online, however, there is also increasing recognition of our need to connect more to nature. There is thus a need (and opportunity) for blended learning approaches that connect people across political, cultural and ontological lines, and corresponding curricula tied to the needs of marginalized students and communities through political action-based change.

Ever since the rise of the network society (Castells, 2009), campus-based schooling has been penetrated through the development of information technology. The boundary between campus schooling and non-campus learning has been blurred, a process accelerated by the COVID-19 pandemic. In the new computer-based



and overhead-camera-equipped classroom, nearly all of the teaching and learning activities are datafied (**Williamson, 2017**), including private information, registering while it influences

identity information and social civility (bullying, sexting). The preferences of teachers and students can be digitized and stored. With the Internet of Things and the wide use of face

recognition technology and mobile media in daily life, everything that happens in every corner of the campus can be captured, recorded and remotely controlled, reducing schools and universities to one interconnected panopticon. These highly surveilled curriculum milieus, to use Schwab's term (1973), has been widely celebrated as a technological triumph in education, but it has also been recognized by many scholars as a crisis that will lead to unpredictable privacy risks, stunted social development, increased plagiarism, political passivity and other deleterious effects (UNESCO MGIEP, 2019; Yan, 2020).

... curriculum design and classroom teaching could deliberately leave some 'dead corners' in order to create enough 'psychological space'.

Once students and teachers become accustomed to daily violation of their privacy by such a panoramic prison-style classroom monitoring system (Zhang, 2020), their awareness of the protection of personal information and privacy will weaken. If children are exposed to such a panopticon from a very early stage, it will be very challenging for them to develop proper self-recognition.

Without privacy, the development of self-identity will atrophy. Furthermore, once the relatively closed classroom is turned into a public space, students and teachers will likely worry that their words and deeds will be disclosed to the public. Wary of the danger, they may intentionally insulate themselves, not showing their real selves; or they will give 'front stage' performances in class (Goffman, 1959), but unfortunately without enough privacy for 'backstage' performances after class, which will surely do harm to the identification and harmony of self.

There needs to be a conversation around strengthening privacy and legislative protection, raising teachers' and students' awareness of privacy issues. In addition, curriculum design and classroom teaching could deliberately leave some 'dead corners' in order to create enough 'psychological space' (Schwab, 1978) for children, youth and teachers to feel free to play, and learn through trial and error.



In recent decades, LGBTQ+ concerns have been at the forefront of efforts to understand the curriculum as gendered.

8.3 .4

GENDER

Understanding curriculum and pedagogy as gendered (**Pinar et al., 1995; Hendry, 2011**) offers a crucial lens through which education can be understood as a patriarchal intervention into the intimacy of women's relationships with children, substituting objectivity and mastery for attachment and dialogue (**Grumet, 1988**).

Given that the majority of K–12 teachers are women – in the public imagination even if not in empirical fact – and the majority of politicians and policy-makers are male, 'school reform' can also be decoded as another form of misogyny, as men seek to ensure women comply with their demands (**Pinar, 2019**).

School knowledge itself can be comprehended as gendered, as the sciences – 'hard' and 'objective' – are prioritized over the soft sciences, for example, the human sciences, including the arts and

humanities. In recent decades, LGBTQ+ (lesbian, gay, bisexual, transgender, queer or questioning) concerns have been at the forefront of efforts to understand the curriculum as gendered (**Pinar, 1998**). Gender imbalance in the distribution of power over curriculum development, and reflected in curricular content itself, demand far more attention from policy-makers, government officials, textbook authors and other stakeholders.

8.3 .5

THE ROLE OF NEUROSCIENCE IN CURRICULUM AND PEDAGOGY

There is increasing interest in the role of neuroscience in education (**Billington, 2017**), with the contention that understanding the neural bases of learning and memory can provide not only new and valuable scientific insights

Massive changes in the structural and functional architecture of the brain during and after the acquisition of literacy has provided evidence on the plastic nature of the brain and how learning instructions and knowledge acquisition can shape and reshape brain architecture.

into how knowledge is produced, but also how it can be applied in educational settings (**Gersmehl and Gersmehl, 2011; Nouri, Mehrmohammadi and Kharrazi, 2014**). This field of educational neuroscience (EN), which integrates biology with cognitive science, development and education, has informed several theoretical frameworks for learning and optimal classroom practices consistent with knowledge about brain function (**Jensen, 2007; Goswami, 2008; Tokuhama-Espinosa, 2015**).

Literacy and numeracy are two areas where neuroscientific evidence has increased our understanding of how the brain processes information and learning instructions to develop skills. The neurobiological basis of processing multiple languages, decoding written words and acquisition of reading skills have informed what are the optimal inputs and sensitive time periods that can help achieve language proficiency and literacy during schooling (**Kuhl, 2011; Dehaene, 2020**). In the domain of mathematics, number representation and

numerical processing in the brain (**Venkatraman, Ansari and Chee, 2005; Ansari, 2008; Holloway and Ansari, 2009; Dehaene, 2013; De Smedt and Grabner, 2016**) and the biological basis of social maths anxiety can inform new pedagogies (**Maloney, Ansari and Fugelsang, 2011; Buckley et al., 2016; Sokolowski and Ansari, 2017**).

Massive changes in the structural and functional architecture of the brain during and after the acquisition of literacy has provided evidence on the plastic nature of the brain and how learning instructions and knowledge acquisition can shape and reshape brain architecture (Dehaene, 2011). Development of numeracy and literacy skills in the early years of schooling is imperative for learning new skills and building knowledge (**WG3- ch5**). However, recent findings from neuroscience and behavioural research have also highlighted the role of emotion and its interaction with cognitive processes in learning, indicating the importance of awareness of learners' emotional and mental states (**Immordino-Yang and Damasio, 2007; Hinton, Miyamoto and Della-Chiesa, 2008**). It is noteworthy that despite the emerging evidence



... neuroscience findings have yielded significant advances in developing pedagogical practices for students with learning difficulties.

from EN on different domains of learning and education there is currently no framework that systematically integrates brain principles with curriculum theory and practice.

Notwithstanding the innovative research being carried out in the field of EN, a focal question is how (or to what extent) EN research can be practically translated into curriculum and pedagogy. On the one hand, translating EN findings into classroom practices and pedagogies depends on a multitude of factors, one of which is teacher training (Wilcox et al., 2020). One study claims that a thirty-six-hour teacher training programme based on EN findings resulted in the improvement of teachers' lesson plans to include more enriched student-centred instructional practices (Schwartz et al., 2019). However, while neuroscience findings have yielded significant advances in developing pedagogical practices for students with learning difficulties such as dyslexia, dyscalculia, autism spectrum disorder and attention

deficit hyperactivity disorder (see WG3- ch6), some scholars have critiqued EN's lack of focus on questions of learning and pedagogy relevant to real-world classroom practices. This includes conclusions based on small sample and effect sizes, and emphasis on replicability and generalization of research findings without considering the different sociocultural contexts in different populations (Taubman, 2009; Spring, 2012). At a deeper level, there is also a debate about whether EN insights are radically transformative to mainstream educational scholars or practicing teachers (Schrug, 2011), with some scholars arguing that EN findings are at best additive to the knowledge already acquired through other disciplines by explaining the biological basis of such findings (Hille, 2011). EN research would then relate less to debates over what should be taught or why, but to how a given curriculum might be more effectively implemented (Stern, 2005).

In addition to such technical

EN has a role to play in informing efforts to achieve curricular and pedagogical improvement through generating knowledge on the abilities, variabilities and constraints of the ‘learning brain’.

considerations – as to whether specific neuroscientifically informed interventions seem to ‘work’ in terms of improving educational outcomes (see **WG2-ch7 and WG3**) – concerns have been raised regarding neuroscience as a ‘discourse’, or a way of talking about education and learners. Critics see EN as lending itself to a radically individuating, socially and politically decontextualized vision, with education reduced to a process of moulding and sorting learners-as-brains for roles in a taken-for-granted social order (**Bradbury, 2021**). Whatever the fairness of such charges (see **WG2-ch1**), the focus of neuroscience on learning as a biological process can detract from consideration of the ideological and political nature of curriculum, and the crucial role of schooling in the political conditioning of students (as distinct from their ‘social and emotional’ conditioning, see below).

To conclude, EN is another facet in the perennial debate as to how teachers can apply theoretical evidence to practical applications

(**Hille, 2011**) and how ‘usable knowledge’ can be translated into improved educational policies and practices (**Christodoulou, Daley and Katzir, 2009**). But the rapid emergence of neuroscience as a field, and the massive hype surrounding it, are attributable at least as much to contemporary political and cultural conditions (i.e. the interests or proclivities of key stakeholders) as they are to purportedly ‘objective’ scientific developments. EN is an evolving field; many practitioners are aware of the criticisms raised here and are seeking to address them (refer to **WG3 for further reading on EN findings and critical issues in EN**). EN has a role to play in informing efforts to achieve curricular and pedagogical improvement through generating knowledge on the abilities, variabilities and constraints of the ‘learning brain’ (**Stern, 2005**). However, there is need for further research, particularly of an interdisciplinary kind, if some of the expectations invested in EN are to be moderated, and neuroscientific insights incorporated into a more holistic vision of education that



extends beyond individual brains to the social, political and cultural contexts that shape both learners and the content of the curricula they study^[1].

8.3 .6

SOCIAL AND EMOTIONAL LEARNING

As noted above, one curricular area in which EN has had a significant impact relates to conceptualization of the socializing function of education – its role in preparing us as citizens and functioning members of various collectivities. Neuroscientists have pointed to increasing evidence linking emotions, social processing and self, whereby beyond cognitive aspects of academic skills, we are

learning more about the reasons why we engage in specific subjects, what they mean to us, and the joy and anxiety they create in us (O'Brien and Howard, 2016). The term 'social and emotional learning' (SEL) has been coined to describe the process of fostering the social and emotional 'skills' (e.g. emotion regulation, self-management, social awareness, relationship skills) of children and young people through explicit instruction in the context of learning environments that are safe, caring, well-managed and participatory (Humphrey, 2013; Weissberg et al., 2015; see WG1-ch5 and WG3- ch4 for further discussions on SEL). SEL skills are portrayed as helping children to effectively navigate the social world and promote resilience to victimization, violence and other negative processes and outcomes (Sklad et al., 2012), while also facilitating learning in the classroom (Durlak et al., 2011).

Neuroscientists have pointed to increasing evidence linking emotions, social processing and self.

See the previous chapter on EN. Since the 1990s, EN has grown into a field that attracts substantial funding. The 'Decade of the Brain' in the United States(1989–1999) saw massive government resources funnelled into brain research, and this initiative was subsequently emulated in many other countries, including Japan, China and Germany (<https://paperpile.com/c/ss17QN/mvHnI/?locator=8-9>) (Gabriel, 2017, pp. 8–9). Meanwhile, funding in most countries for the social sciences and humanities has either stagnated or gone into relative decline, especially since the 2008 financial crisis. In part, then, the fact that EN has prospered while social sciences have struggled is attributable to the categorization of neuroscience as a 'science', and of mainstream educational studies as 'social sciences', in a context where funding for the natural sciences has been prioritized over the social sciences and humanities. In 2010, the British Government abolished core public funding for arts, humanities and social sciences courses at UK universities, while maintaining funding for science, engineering and medicine courses. In Japan, the Education Minister in 2015 expressed skepticism about the value of funding humanities and social sciences in national universities. Funding was subsequently slashed, with education departments a particular target of the cuts, forcing many to close (<https://paperpile.com/c/ss17QN/eYTHy/?prefix=sec>) (see Vickers, 2020). For further discussion of funding issues and the political context for the rise of EN, see WG2-ch7.



Learning is a social process and it thus stands to reason that improved social and emotional ‘competence’ will facilitate academic success. Longitudinal research supports this proposition (**Panayiotou, Humphrey and**

Wigelsworth, 2019), and indeed life course studies highlight the predictive utility of SEL skills for mental health and labour market outcomes in adulthood (**Goodman et al., 2015**). Accordingly, effective promotion of SEL skills



Besides causing mass destruction of lives and economies, the pandemic highlighted the importance of empathy.

has emerged as a policy priority in education systems around the world. Several meta-analyses have rigorously demonstrated that universal SEL interventions implemented by class teachers can lead to meaningful and lasting improvements in a range of outcomes including social and emotional competence, mental health and academic attainment (Durlak et al., 2011; Wigelsworth et al., 2016; Taylor et al., 2017).

Advocates of the importance of SEL have pointed to the ways in which different communities responded to the COVID-19 pandemic. Besides causing mass destruction of lives and economies, the pandemic highlighted the importance of empathy. Many ordinary citizens from across the globe have become #coronaheroes – some are running community kitchens for migrants, while others are organizing mass mask supplies for frontline workers (Revkin, 2020). As such, the pandemic can be viewed as a catalyst of SEL. The National Education Association in the US put out a statement

calling for SEL to be the priority during and after the COVID-19 crisis (Walker, 2020) and many teachers and experts want to include SEL in all components of the current curricula (see, e.g., Singh and Duraiappah, 2020). World Bank education experts agree that the SEL component has been neglected thus far and given that millions of children are out of school and families continue to suffer financial, mental, emotional and health risks, SEL must be prioritized (Luna-Bazaldua and Pushparatnam, 2020). The World Bank report states that nearly half of the students surveyed in the US reported feeling worried about the potential risk of a close relative becoming infected, but they were also concerned about not learning enough at home to be ready for the next school year. The report also quotes a survey study by the University of Oregon, which shows that children are experiencing difficulties in their social and emotional development and present higher rates of disruptive behaviours than before the pandemic started (Walker, 2020). At the same time, families are

There has been emphasis on the need for the design and implementation of SEL to be carried out carefully so as to minimize unintended consequences such as empathy distress.

experiencing household economic insecurity that limits their capacity to meet their basic needs. Given this, the World Bank has started a youth skilling program in Kaduna State Nigeria that gives SEL the substantial treatment it deserves (**Robinson, Sani and Aminu, 2020**).

However, there are challenges ahead for SEL discourse and practice in terms of curriculum and pedagogy. Although steadily gaining traction in education, SEL is a relatively new concept, and is only just beginning to enter curricula and school activities. There has been emphasis on the need for the design and implementation of SEL to be carried out carefully so as to minimize unintended consequences such as empathy distress (**Singh and Duraiappah, 2020**). Deeper concerns have also been raised regarding the underlying assumptions of SEL, as well as the importance of context in SEL teaching. First, as critiqued by Stearns (2019), it is important for SEL not to be used instrumentally, forcing a kind of ‘hegemonic positivity’

as an end-point for learning (see also **Davies, 2016**). Rather than using children’s emotional and social worlds as a site of learning mastery, Stearns argues for SEL to be a participatory and on-going conversation between students and teachers, echoing the concept of a complicated conversation that frames this chapter. Another important aspect is the need for cultural sensitivity when applying SEL. As discussed in this text, learning, curriculum and pedagogy have been shaped by factors such as colonization, resulting in structural inequalities around the world. Mahfouz and Anthony-Stevens (2020) note that in teaching SEL in Indigenous communities in Canada, there is a disconnect between the well-intentioned focus of SEL to help Indigenous children become more resilient, and the contextual reality of marginalized cultural groups who traditionally prize ‘other’ forms of knowledge. This highlights the need to nuance universalized understandings of SEL with place-based learning requirements.



The focus of SEL on individual ‘learners’ or sociability within small groups is attractive to many policy-makers as SEL skills are widely seen as contributing to more balanced individuals who are resilient in the face of increasing pressures in the labour market. However, we must be careful that this does not distract our attention from contentious social and political issues, involving the relationship between citizens and the state, civic and human rights, and the demands that citizens should feel entitled to make of their governments (**MGIEP, 2017; Bradbury, 2021**). Whether responding to a pandemic or addressing the myriad other crises confronting humanity, we rely not only on local ‘coronaheroes’ or the selfless actions of individual empaths, but also (and significantly) on effective political action. A depoliticized focus on sociability as a matter of individual ‘skills’ and ‘competencies’ is thus no substitute for the pursuit of citizenship education grounded in a critical and contextualized understanding of politics, history and culture.

According to Freirean philosophy, all pedagogy is political and requires radical transformation of teaching and learning.

8.3 .7

ONTOLOGICAL POLITICS AND TRANSFORMATION

According to Freirean philosophy, all pedagogy is political and requires radical transformation of teaching and learning (Giroux, Freire and McLaren, 1988). Fundamental to bringing about such transformation is connecting a critical awareness of unsustainable norms in society with place-based learning (Gruenewald, 2003), appreciating that we must engage with the world to transform it. Such learning can be transformative, and even transgressive, when it engages with the ontological aspect of different ways of ‘being in the world’, and especially when engaging in the political dynamics of such encounters (Chaves et al., 2017). An example of an ontological turn in education is provided by Ubuntu/currere, which brings together

the African notion of Ubuntu and the North-American signifier for curriculum, currere. Pinar (1975) first invoked the Latin word currere, which means ‘to run the course’. Currere privileges the individual because each of us is different – in our genetic makeup, in our upbringing, in our families and more broadly in our race, gender, class, and so on (Pinar, 2011). Ubuntu is derived from aphorisms in African languages and means that our being and becoming is dependent on others. In contrast to Descartes’s, cogito, ‘I think therefore I am’, Ubuntu means, ‘because we are therefore I am’ (Le Grange, 2019). This relationality between humans (Ubuntu) is emblematic of the relatedness of all things in the cosmos.

An important dilemma in bringing about transformations in ‘what’ and ‘who’ we are, is history education in conflict societies.

An important dilemma in bringing about transformations in ‘what’ and ‘who’ we are, is history education in conflict societies. As societies recover from past violence, history education becomes embedded in the complex interrelations between changing systems of power and

a redefined national identity. When facing the question of how to teach students about a recent violent history, recovering societies encounter some major dilemmas and choices (Korostelina, 2016). For example, there is a dilemma between teaching critical history that helps to transform society, and teaching monumental history that increases loyalty to the nation and submission to the ruling elite. Although such a ‘monumentalistic concept of the past’ (Blustein, 2008, p. 13) can help create a sense of cultural identity and security, it also (Blustein, 2008, p. 13) legitimizes the ruling regime and develops loyalty among the younger generation. In other words, historical narratives are based on explicit judgements about the importance of specific events in the history of a particular nation or ethnic group. Although such judgements can be critical to past events, they are influenced by the ideology of a ruling regime that favours some events over others because they are deemed a significant and essential foundation for the regime’s ideas and goals. On the contrary, in



critical history, narratives can be recounted through the process of confronting and considering alternative narratives (Ricoeur, 1995). During this process, stories of different groups and communities within the nation are put together, including dominant and marginalized narratives, allowing multiple interpretations and analyses of the roots and causations of violence, as well as a reconfiguration of dominant narratives through a process of consensus or agonistic dialogue.

These issues reflect the rapidly changing and volatile global, national and local contexts in which schools must function; they place new demands on curriculum and pedagogy and lead to different

responses. The new demands include, but are not limited to: finding ways to engage learners in complexity and ambiguity; teaching them how to grapple with moral and ethical questions; and helping them develop competencies and qualities to find healthier and more equitable ways of living and being while being mindful of planetary problems. The different responses vary from ‘denial’ or trying to keep education as is, to adding new topics to the curriculum, to ‘building in’ or trying to integrate emerging topics and competencies into the curriculum, to a ‘whole system redesign’ where policy-makers, school systems and schools are rethinking the whole curriculum in light of global



8.4

Curriculum and pedagogy in light of emerging global challenges

As we draft this report in 2021, a wide range of interrelated global challenges and crises impinge upon considerations of curriculum and pedagogy – of what we should teach our children to prepare them for a world undergoing

unsettling transformation. Since comprehensive coverage is clearly impossible, we limit ourselves to a few key challenges that relate to the UN's Agenda 2030 and its seventeen SDGs.



... those who are illiterate are not even considered in discussions of curriculum and pedagogy, even though they have a deep yearning to find a way into the world of education and have much to offer.

8.4 .1

RISING INEQUALITY AND POVERTY

Many schools and the communities they serve are affected by rising inequality and poverty in a variety of ways which can be mutually reinforcing. Schooling and learning are impacted in multiple ways as many children and youth lack adequate food and nutrition and suffer from poor health which also undermines their learning. The curriculum often ignores these existential conditions, and there is little opportunity available to make these conditions a subject of education itself (**Chege et al., 2020**). Inequality and poverty can produce parallel tracks: the poor attend public school when they can, while those not suffering from poverty and in some cases even benefiting from it, are in a position to always attend, even to choose private education, thus further exacerbating inequality.

Inequality is also born out of marginalization and exclusion. An important instance of this is when those who are illiterate are not even considered in discussions of curriculum and pedagogy, even though they have a deep yearning to find a way into the world of education and have much to offer. There is a great deal to be gained from involving illiterate people from the start rather than holding them at arm's length. In Somalia and its internationally unrecognized breakaway region Somaliland, for instance, illiterate people have been research co-production partners on the impact of COVID-19 on education (**Herring et al., 2020**).

It is important to guard against the curriculum's complicity with narrow nationalisms organized around ethnicity and language. For example, the narratives of Somali origins in the Arab peninsula have been associated with the standardization of the Somali language, neglecting the Somali Maay dialect (**Eno, Dammak and Eno, 2016**). Worldwide, languages of indigenous peoples

face marginalization and even extinction, and including provision for teaching most of the remaining local languages and dialects in the curriculum is a daunting educational challenge (see **WG3-ch5, WG3-ch6** for more on this).

Finally, there are issues of migration resulting from inequality and poverty that also affect education. (**UNESCO (2019)**) shows the implications of different types of migration and displacement for education systems, as well as the impact that reforming education curricula and approaches to pedagogy and teacher preparation can have on addressing the challenges posed by migration and displacement. In communities where there is a net loss of people, as people try to move elsewhere for a better future, the infrastructure for education further erodes as resources, including professional educators, become scarce. At the same time, communities that experience a net gain of people as a result of poverty and inequality-related migration are pressed to

find ways to integrate refugees and other migrants into what may have been relatively homogeneous communities. Here there might be resistance but also a lack of competence in creating inclusive and welcoming classrooms and communities.

8.4 .2

CLIMATE CRISIS

The Climate Emergency is one of the most prominent manifestations of systemic global dysfunction that affects all life on Earth (**IPCC, 2018**). It connects with all other global challenges as it impacts health, poverty, migration, biodiversity, democracy, and more. Many schools and universities are looking for ways to meaningfully engage students in this rather complex topic, if only because young people are demanding that they do so (**Boulianne, Lalancette and Ilkiw, 2020; WG2-ch2**). The contexts in which schools are doing this varies greatly, from a flooding delta in Bangladesh to a wildfire-

...climate change has been shown to have a moderate to low prevalence in education policy and curricula...



... community-based learning initiatives are experimenting with innovative pedagogical models, such as transformation labs, to promote place-based narratives of climate change resistance.

prone county in California, from a desertifying arid region in Ethiopia to a wealthy community along the Oslofjord with a very high per capita ecological footprint. And then there are schools operating in contexts where trust in science and government is very low, the power of the fossil fuel industry is very high, and where climate change is considered a natural phenomenon and is downplayed as a non-issue, or a highly exaggerated risk.

The curriculum responses are equally diverse: from denial and ‘education-as-usual’ to the acknowledgement of climate change as an important topic in some school subject areas, to it being a cross-cutting theme for interdisciplinary learning and problem-oriented education, and a critical part of a so-called ‘whole school approach’ to sustainable development (**Mogren, Gericke and Scherp, 2019**). The latter refers to a more systemic approach to working with wicked problems, such as climate change, by not only looking at the implications for the ‘written’ curriculum but also paying attention to the

implications for pedagogy and learning, school-community connections, a school’s own ecological footprint, and the professional development of teachers and other school staff. Despite climate risk being a serious problem recognized by the UN and many national governments (**IPCC, 2018**), climate change has been shown to have a moderate to low prevalence in education policy and curricula (see **UNESCO MGIEP, 2017, p. 48 for Asia**), and when it does, it still fails to address the underlying causes (**Kagawa and Selby, 2010**). More recently, schools and universities have also been discussing how to deal with the climate anxiety and associated feelings of despair that many young people are experiencing and bring to the classroom (**Besley and Peters, 2020; Todd, 2020**). In response to challenges in formal education, community-based learning initiatives are experimenting with innovative pedagogical models, such as transformation labs, to promote place-based narratives of climate change resistance (**Macintyre et al., 2019**).

8.4 .3

EROSION OF DEMOCRACY AND TRUST IN INSTITUTIONS

Although the relationships between governance, educational freedom, student participation and democracy are highly complex and play out differently in different sociocultural settings, there are certain seemingly universal patterns. While, arguably, there has been a global spread of democracy in the decades after the Second World War, recently there has been considerable ‘backsliding’ and the creation of a ‘democratic deficit’ in long-established democracies (**Wals and Peters, 2017**). In many countries, economic liberalism has crowded out political liberalism, essentially reducing democracy to market principles: policies as products, voters as passive consumers,

politicians as producers, elections as markets (**Wals and Peters, 2017**). Across the globe, privatization of public education ('school choice', vouchers and charter schools; **see WG2-ch3**) involves a deliberate shrinking of the government's role in the development and protection of civil society. Turner (2014) points out that as a pedagogical model, this historical project submits youth to the logic of hyperindividualism and disengages them from community and society in general and, as a result, makes them less prepared and less able to cope collectively with the consequences. Deliberative democracy and associated local participation have been eroded by neoliberal reforms that minimize the role of the government and leave key decisions and choices to the markets and the actors that control them. As noted above, promotion of SEL may be complicit in attempts to depoliticize education's socializing role, shifting the focus to the adaptation of individual learners to a given socio-political status quo, rather than encouraging them to press for political and



Education, especially when it is based on action pedagogies, can play a significant role in joining up a deliberative ecological democracy with new forms of activist science and the rapidly growing forms of citizen science.

social change in the interests of justice and sustainability.

Some scholars point out that with this erosion the educative power and its pedagogical force intrinsic to a deliberative democracy is lost, making it difficult if not impossible to teach students to reason about ecological issues and to accept responsibility for their daily practices and actions (**Selby and Kagawa, 2014**). The deliberative nature of ecological democracy has strong roots in grassroots participation in civil society. In philosophical terms it is indebted to John Dewey (1923). Free and open debate in society and the classroom is a necessary condition for the legitimacy of democratic political decisions based on the exercise of public reason rather than simply the aggregation of citizen preferences as with representative or direct democracy. Education, especially when it is based on action pedagogies, can play a significant role in joining up a deliberative ecological democracy with new forms of activist science and the rapidly growing forms of citizen science

that encourage the use of empirical evidence and logic in a post-truth world driving community-based science projects and encouraging linked-up international scientific agendas that promote collection of data and careful evaluation based on systematic observation and experiment (**Wals and Peters, 2017**). Some UNESCO declarations and statements emanating from CONFINTEA (CONFérence INTernationale sur l'Education des Adultes: International Conferences on Adult Education) hinted at this when they described adult education as 'a consequence of active citizenship and a condition for full participation in society' (**UNESCO Institute of Education, 1997, p.1**) and 'a powerful concept for fostering ecologically sustainable development, for promoting democracy, justice, gender equity, and scientific, social, and economic development, and for building a world in which violent conflict is replaced by dialogue and a culture of peace based on justice' (**UNESCO Institute of Education, 1998, p. 3**). However, it is hard to see how the school curriculum

Curriculum and pedagogy tend to reflect the social, political and cultural context beyond the school gates. In societies where political pluralism and free speech are generally restricted, it is therefore highly unlikely that curriculum will become an effective instrument for transforming the status quo.

can function effectively as the bearer of liberal democratic values in societies where the political and legal context severely limits the scope for active democratic citizenship; the educational ramifications of Hong Kong's 2020 National Security Law dramatically illustrate this point. Curriculum and pedagogy tend to reflect the social, political and cultural context beyond the school gates. In societies where political pluralism and free speech are generally restricted, it is therefore highly unlikely that curriculum will become (or be allowed to become) an effective instrument for transforming the status quo.

The loss of trust in both science and government, and the cultivation of chaos, fear and doubt by groups in society who see emerging global challenges such as pandemics, migration and climate urgency as an opportunity to strengthen their power and expand their reach, also further undermines the possibilities for more deliberative and dialogical forms of education. Schools struggle in finding ways to

navigate the tensions and develop the kind of critical literacy their students need to see what lies underneath and the risks this cultivation poses for people and the planet (**Selby and Kagawa, 2020**).

8.4 .4

LOSS OF BIODIVERSITY

The recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (**Brondizio et al., 2019**) and World Wildlife Fund (**WWF, 2020**) reports confirm that we are currently in the midst of the sixth wave of mass extinction of species. Not only is this a moral issue, as one single species determines the fate of virtually all others, it also puts the survival of homo sapiens at risk as the loss of biodiversity also implies the loss of vital ecosystem functions and the self-healing and regenerative capacities of Earth. Biodiversity loss is deeply connected to all we do: mining, forestry, diet, energy use, even our increased



An emergent pedagogical approach to restoring and regenerating healthier connections between people and the planet is ecopedagogy.

reliance on technology, which demands energy, space for data storage centres, rare earth metals, and the type of attention that disconnects people from their physical surroundings, lead them to sacrifice ‘green time for screen time’.

Much like climate change, schools and communities are affected differently by this loss, just as they are contributing differently to this loss. Schools and the people who make up schools are entangled in biodiversity, often without realizing it. One challenge is to make these connections more visible while also learning how to positively influence biodiversity locally. This might require conversations about the greening of school grounds (**Harvey, Gange and Harvey, 2020**), the harvesting of rainwater (**O'Donoghue, 2018**), the (re)considering of diets, the creation of school and community gardens (**Fischer et al., 2019**), and finding ways to link these conversations to the more formal curriculum and the more informal relationships between the school and local actors who can support

schools (**Holland, 2004**). At the same time, critical analysis of the structures and mechanisms that lead to massive species extinction on a global scale must also find its way into such conversations.

An emergent pedagogical approach to restoring and regenerating healthier connections between people and the planet is ecopedagogy. Ecopedagogy, as described by Kahn (**2010**), combines the critical pedagogy of Freire (**1970**) with future-oriented ecological politics, and learning rooted in existential issues that demand critical analysis of the discourses surrounding sustainability, including issues around food, social justice and biodiversity, and which require different forms of dialogue. An example of ecopedagogy comes from Colombia where project ‘Pan Rebelde’ (rebel bread) aims to reconnect humans with nature by facilitating students’ connection to food through local gardening, and the sharing of recipes and traditional food dishes in informal, intergenerational spaces of culinary transformation. Through

Emerging post-human perspectives on education propose more relational forms of learning that decentre humans to open up spaces for entanglement with other species, including non-human animals.

this process and these spaces, critical awareness is promoted in students, encouraging them to reflect on and transform the reality of their consumption habits (**Bauman, 2007**) in the perspective of food sovereignty and health (**Anderson, 2018**). Pan Rebelde reiterates the fact that eating is a political act, whereby growing, cooking and sharing local food is an exercise in civil resistance towards the detrimental influence of the global food industry in people's daily lives. As such, Pan Rebelde constitutes a way for students to enter into relationships with social actors such as 'seed guardians' and peasant markets, learn practical skills such as food production and cooking, and encourage autonomy from the global market system.

The question of biodiversity in education is also a question of how humans connect with non-human animals and the more-than-human world. Emerging post-human perspectives on education propose more relational forms of learning that decentre humans to open up spaces for entanglement with other species, including non-human animals. It is suggested that development and enactment of such forms of learning will help recognize that the human species is not superior to other species but rather part of a living web of highly interdependent sentient creatures whose well-being should not be undermined or compromised (e.g. **Malone, Tesar and Arndt, 2020**).



8.5

Implications for curriculum and pedagogy

The trends and challenges analysed in this chapter, and discussed in more depth in the earlier chapters of this report, reflect the rapidly changing and volatile world situation in which schools and other educational institutions are forced to function in the early twenty-first century. No single chapter can aspire to a comprehensive survey of the implications for curriculum and pedagogy, and we invite the reader

to explore other chapters in this report which particularly relate to curriculum and pedagogy, such as a curriculum framework for flourishing in education (**WG1-ch4**) and learning disabilities (**WG3-ch6**). To conclude this chapter, we contribute some important components of the ‘complicated conversation’ that we consider curriculum and pedagogy to be in light of global sustainability challenges.

... hybrid learning ecologies, which combine different forms of learning, ways of knowing, multiple technologies and conduits for learning.

8.5 .1

REORGANIZATION OF THE CURRICULUM TOWARDS HYBRID LEARNING ECOLOGIES

There is an urgent need for more placebased, rooted curricula, which address those existential questions educators and students face. The notion of a ‘living curriculum’ connects existential questions that people in and around the school community are facing with practical, local action, while always exploring how the local is nested in the wider world. This offers the possibility of making education relevant, responsive and reflexive as many of these questions do not have definitive answers but require a continuous rearticulation of the question in light of what is encountered and learnt. We can understand such curricula as hybrid learning ecologies (**Barnett and Jackson, 2019**), which combine

different forms of learning, ways of knowing, multiple technologies and conduits for learning. They involve working with different stakeholders, building school–community connections and using alternative forms of assessment – linking science and technology and society in (re)generative ways. These are curricula that respect and recognize the traditional knowledge of indigenous peoples, ancestry and intergenerational dialogue as crucial for the sustainability of life on Earth. They are also directly opposed to any form of ethnic, racial, gender and class oppression, as well as ableism, ageism, and the exploitation of human labour, fauna and flora species, and the environment. Such a values based education moves away from mechanical/materialistic ‘tangibles’ towards organic ‘intangibles’, seeking a more humanized approach to education. The emphasis is on doing better things in life rather than just doing things better for the marketplace. Thus it is imperative that education is based on the three core values of sympathy, empathy and compassion, as



is demonstrated in the above example from the IIUM.

8.5 .2

RESPONSIBLE EDUCATION- DRIVEN SCIENCE AND TECHNOLOGY UTILIZATION

Responsible research aims to encourage the design of inclusive, sustainable research and innovation, and create spaces and opportunities for socially desirable approaches undertaken in the public interest.

Responsible research is a ‘new’ approach that anticipates and assesses potential implications and societal expectations with regards to research and innovation. It aims to encourage the design of inclusive, sustainable research and innovation, and create spaces and opportunities for socially desirable approaches undertaken in the public interest. In this respect, it is important to balance the current fetish for technology-driven innovation (EdTech), with an emphasis on ensuring human rights such as water, sanitation, quality food and housing, as

well as disease prevention, free vaccination and universal access to health care. Critical actors in this endeavour are teachers. To play their role as agents of curriculum reconstruction, and to model the autonomy, creativity and criticality we expect them to impart to students, teachers need to be freed from the tyranny of textbooks, test-driven teaching, and panoramic surveillance and managerialism. Teachers need to benefit from and be supported by technological advances, rather than mechanized and disempowered. This might entail competency-based teacher curricula as well as responsibly designed lifelong learning systems, resulting in wider public recognition of teacher professionalism in their practical work, alongside adequate policies to protect the esteemed status of teachers.



8.5 .3

PARTICIPATION, DEMOCRACY, PARTNERSHIPS AND CRITICAL LITERACY

In the midst of political polarization and educational neoliberalism, there are hopeful signs of new alliances towards more equitable and just societal outcomes. The partnerships between schools and universities

with grassroots movements such as Black Lives Matter, and peasant movements such as La Vía Campesina (in Latin America) and The Landless Workers' Movement (in Brazil), among others, demonstrate potential benefits for the learning of citizenship, participation, collective decision-making, and for the democratization of educational institutions. To avoid maintaining the status quo, such partnerships need to move away from the instrumentalist language that continues to dominate policy-makers' conceptions of curriculum and pedagogy. Such language includes performative



words like ‘aims’, ‘objectives’, ‘curriculum development’, ‘achievement’ and ‘assessment’ to the invocation of non-performative words and phrases such as ‘curriculum/pedagogical improvisation’ and ‘curriculum/pedagogical experimentation’. Important here are concepts such as ‘indigenization’ and ‘decolonization’ (confronting and challenging the colonizing practices that have influenced education), and being inspired by new vistas of knowledge that have been marginalized or forgotten, such as values-related knowledge and wisdom leading to more life-oriented educational processes that are sustainable, culturally based and locally relevant.

... it is important to broaden curriculum and pedagogy to include understandings of SEL that incorporate empathy for our shared home on Earth as an extension of empathy for each other.

In response to a mainstream human capital approach to skills acquisition, which is proving increasingly incompatible with a changing world of uncertainty, it is important to broaden curriculum and pedagogy to include understandings of SEL that incorporate empathy for our shared home on Earth as an extension of empathy for each other, and which links individual and community resilience to environmental resilience. But SEL focused on the skills and competencies of individual learners needs to be integrated into a curriculum that alerts students to the complex challenges of politics, economics, cultural diversity and environmental sustainability. This can help raise awareness of how issues like environmental degradation and biodiversity loss pave the way for the spread of deadly pandemics like COVID-19, droughts that cause mass hunger, and other human challenges including climate change and the climate fear and anxiety which is affecting young people across the globe. Story-telling, role-playing, place-

8.5 .4

CREATING SPACES FOR EMOTIONS AND ‘BEING’ IN EDUCATION (SUBJECTIFICATION)



8.6

Concluding thoughts

Appreciating curriculum and pedagogy as political, social, cultural and, indeed, ecological – evolving with the unexpected twists and turns of a changing, uncertain, ambiguous and volatile world – helps us engage in what is, essentially, a complicated, albeit fascinating, conversation. As this chapter demonstrates, there are diverse traditions of how curricula have been developed, but they are all influenced and shaped by a range of interrelated

globalizing forces that include: commodification of nature and the public good; the technification of learning; runaway climate change; and the loss of democracy coupled with rising inequality. Counter-movements and transition niches tend to represent forms of decolonization, localization and ‘off-the-grid’ development that seek more autonomy and space for self-determination, a deeper connection with self and place, a search for meaning





and happiness, and a (re)turn to values of community, solidarity and care. While these movements are small and the niches are still scarce, resistance towards prescribed nationalized curricula that emphasize cognitive learning and are preoccupied with assessment and measurement is growing among all stakeholders in education: pupils/students, teachers, school administrators and parents, and, albeit with some delay, educational policy-makers. The idea of more localized ‘place-based’ curricula, co-shaped by the members of the school community, working with the local environment and the life-world of the learnings, is becoming more appealing. Interest in fields such as SEL, and critical explorations into a decolonized curriculum, are also rising. With the increasing flow of information, up against the need for more conversation concerning complex societal challenges, there is the need for more ‘dead corners’ and ‘spaces in between’ where students, teachers and learners have the opportunity to organically experiment with alternatives to

current mainstream approaches to education.

In conclusion, the authors acknowledge the difficulties involved in the practical implications of engaging with a ‘complicated conversation’ in teaching and learning. Rather than undermining the particularity of learning contexts through standardized curricula, which tend to ignore culture, politics and history, this chapter highlights the emerging tendencies of engaging with the diverse views, perspectives and values of stakeholders in what is most definitely a complicated conversation. Rather than the idealistic goal of reaching a consensus around the curriculum table on what is an increasingly polarized society (e.g. what voice should we give climate change denialists and anti-vaccine activists?), a more practical route is taking a reflexive approach to ‘muddling through’ curriculum and pedagogy issues towards provisional accommodations, accepting the inherent tensions so as to keep disparate agencies involved in the conversation.

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C H A P T E R

9

Assessment in context

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This chapter analyses educational assessment in relation to its social, cultural, economic and political context. We suggest that the worldwide focus on assessment of learning, partly driven by the influence of the OECD, is related to the idea that allowing ‘merit’, defined in terms of measurable learning outcomes, to determine life chances is an adequate guarantor of social justice. From this dominant perspective, education is also seen primarily as serving to form productive workers rather than enhance flourishing or promote truly sustainable and equitable societies. The latter goal instead calls for a holistic and humanistic approach to education and a less high-stakes model of assessment for and as learning. We suggest that some important aspects of education for child flourishing cannot easily, or appropriately, be subjected to quantitative assessment. It has been claimed that technological advances enable better assessment of higher-order skills with the potential to improve teaching, but we argue that any benefits to teachers and students remain unclear. Understanding the complex relationship between assessment and context requires analysis of public discourse on science and evidence, the influences that shape it, and the role of vested interests. We therefore emphasize the need to recognize how ideological beliefs, economic interests and political agendas drive assessment reforms around the world, stressing that inclusive and holistic approaches to assessment need to take proper account of the sociocultural and economic concerns of the communities they serve.

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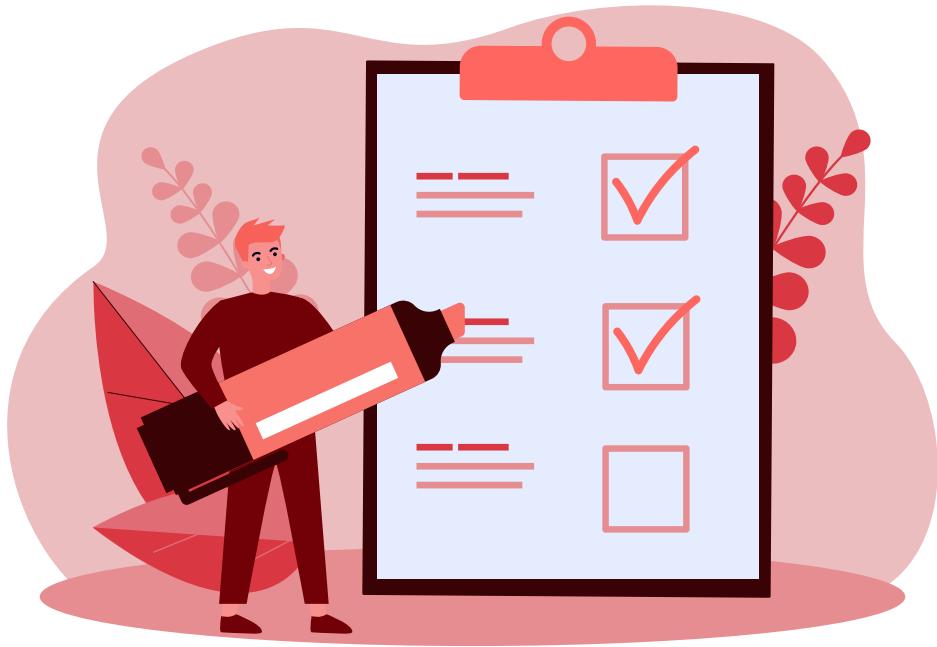
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9.1

Introduction

In recent decades, there has been a discernible expansion in the range, scope and intensity of educational assessment, from individual assessment to national classroom monitoring and cross-national comparisons. Much of this expansion has been underpinned or legitimated by claims for the role of science and evidence in the creation, implementation, evaluation and validation of assessment instruments. Advancements in the fields of neuroscience and information technology have been portrayed as challenging established assessment practices, offering the promise

of an ‘assessment revolution’. Meanwhile, international organizations, such as the World Bank, UNESCO and the OECD, have become key players in promoting and delivering cross-national comparisons based on quantitative assessment of educational ‘outcomes’, and in advancing the application of new technology in this area.

Assessment is an inescapable and necessary feature of any education system, and indeed of the activity of learning itself. As we discuss below, it can take many different forms and perform

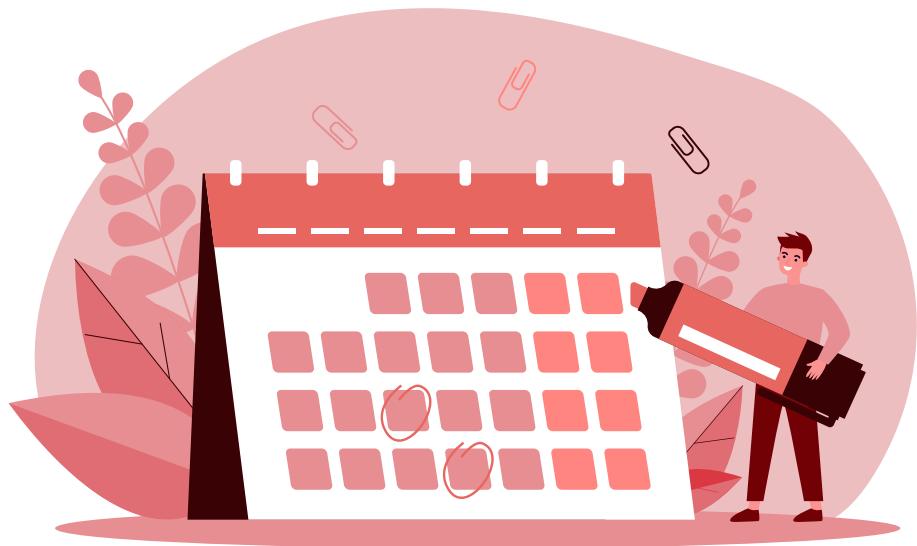


Assessment is an inescapable and necessary feature of any education system, and indeed of the activity of learning itself.

many different purposes. But assessment practices or techniques are far from the value-neutral, context-independent tools for the maximization of ‘effectiveness’ or ‘efficiency’ in learning and teaching that much public policy debate assumes them to be. As the previous chapter on curriculum and pedagogy emphasized, ideas concerning what should be taught and learnt, how, and why have always varied widely across space and time. This variation cannot be understood without grasping the ways in which the social, cultural and political context shapes educational institutions and beliefs. As with curriculum, so with assessment – our assumptions about what is worth assessing, why and how assessment should be conducted are fundamentally context-dependent. Assessment practices can serve to empower teachers and learners, but they can also disempower, narrowing the scope of learning and impoverishing education in the name of ‘accountability’.

This chapter seeks to explain this Janus-faced quality of educational

assessment in relation to the social, cultural and political context. Moreover, we also need to understand both the contextual influences on our assessment practices, and how those practices themselves form a crucial part of the context that shapes education. What does the drive to generate quantifiable metrics of educational ‘outcomes’ imply for the curricular status of fields, such as the arts and humanities, in which learning is especially difficult to measure quantifiably? Who should control assessment regimes or have access to the information they generate, and for what purposes? What is the relationship between educational assessment, ideology and social and political control? When and why does assessment of education become oppressive and intrusive, atomizing individual learners and reducing learning to little more than an intense competition to certify acquisition of epistemological and social ‘capital’? How much assessment is enough – or too much? And how do calls for an approach to assessment driven by ‘science and evidence’ relate to such questions?



9.2

Assessment and learning

In this section, we review the forms of assessment, noting that educational assessment has served varied functions in different systems of education and at different times. Assessment has been entangled in structures of power embedded in political and economic regimes, ideas about capabilities entrenched in sociocultural hierarchies and ideological assumptions concerning ‘official knowledge’ (Apple, 1993). Therefore, assessment is not a neutral device; its aims and techniques are determined in complex ways by the context in which it operates.

9.2 .1

FORMS OF ASSESSMENT

9.2 .1 .1

ASSESSMENT OF LEARNING (OR ‘SUMMATIVE ASSESSMENT’)

The summative assessment of learning can be traced back to the civil service examinations conducted by China’s imperial rulers during the first millennium CE. Its most basic function is to



... has been used to describe the process of evaluating the effectiveness of sequences of instructional activities to provide information for judging the overall value of an education programme.

rank and score learners, thereby lending meritocratic legitimacy to selection of individuals for opportunities for further study or employment. This form of assessment has been used to describe the process of evaluating the effectiveness of sequences of instructional activities to provide information for judging the overall value of an education programme – as well as for ranking and scoring learners for selective purposes. The process relates to the mechanics or steps required to effectuate a judgement, which cannot be made within a vacuum and require predetermined standards and goals to make comparisons.

In the specific area of assessing students' performance it is used to evaluate what students have learned at the end of a course or a grade level, or as a selection method for entry into educational tracks (Wiliam, 2011). A typical example of summative assessment today is the Gaokao system in China (modern descendent of the imperial civil service examinations of old) in which

the results of the annual national exam determine students' entrance to the higher education system or to access certain credentials such as an undergraduate degree or a technical job certificate (Gu, Ma and Teng, 2017). Data resulting from such assessment programmes can also report the quality of teaching, differences in achievement levels by subgroups (such as gender or region) and, if background data are collected, factors that contribute to reaching different levels of achievement (Lietz et al., 2008). School boards or ministries of education also often use summative assessments to keep publicly funded schools accountable for the provision of their education (Schildkamp and Kuiper, 2010).

9.2 .1 .2

ASSESSMENT FOR LEARNING (OR 'FORMATIVE ASSESSMENT')

In the latter half of the twentieth century, a considerable shift occurred from assessment of learning to assessment for

...‘assessment for learning’ stresses the ways in which assessment can contribute to efforts by teachers and students to seek, reflect upon and respond to information from dialogue, demonstration, and observation in ways that enhance ongoing learning.

learning to better capture the characteristics of assessment and to serve the purpose of furthering students’ learning (**Schuwirth and Vleuten, 2011**). Talk of ‘assessment for learning’ (or what is often dubbed ‘assessment’) stresses the ways in which assessment can contribute to efforts by teachers and students to seek, reflect upon and respond to information from dialogue, demonstration, and observation in ways that enhance ongoing learning (**Broadfoot et al., 2002**). Therefore, this form differs from the assessments designed primarily to serve the purposes of selection, accountability or certifying competence. It has an undoubted appeal when contrasted with the assessment of learning. However, the distinctions between assessment for learning and assessment of learning relate primarily to the purpose for which the assessment is carried out (**Black et al., 2004**). In practice, the same assessment techniques can often serve either a summative or formative purpose, depending on who is conducting the assessment, who has access to the resulting information, and how they choose to use it.

9.2 .1 .3

ASSESSMENT AS LEARNING

Assessment as learning refers to the process whereby students are able to learn about themselves as learners and become aware of how they learn. Through self and peer assessment, students reflect on their progress and (often with the help of teachers) decide what their next learning objectives will be. It also helps students to take more responsibility for their own learning and monitoring future directions. The role of teachers in assessment as learning is to promote the development of independent learners by modelling and teaching the skills of self-assessment, guiding students in setting their own goals, and monitoring their progress towards them. Teachers also help create an enabling environment where students are encouraged to confront challenges and to develop strategies to adjust and advance their learning. It may be suggested that this form of assessment as learning associates with the idea of what Dweck (2008) calls a growth



mindset compared to a fixed mindset. Students with a growth mindset believe that their abilities can be cultivated and that success is about stretching themselves to learn something new.

9.2 .2

OBJECTS OF ASSESSMENT

... the logic of human capital theory suggests that these domains are critical for preparing individuals to fulfil their productive potential, and thus contribute to maximizing (national or corporate) economic performance.

Whilst assessment as learning has great potential to empower students and foster ongoing learning, in contemporary education systems, the focus of assessment has been to identify and evaluate skills that are primarily related to the academic domains of reading, mathematics and science.¹ This has been driven fundamentally by the logic of human capital

theory (HCT), which suggests that these domains are critical for preparing individuals to fulfil their productive potential, and thus contribute to maximizing (national or corporate) economic performance (Hanushek and Woessmann, 2008). A classic example of this is the OECD's Program for International Student Assessment (PISA), a triennial assessment of students' performance in these key domains. Reluctant to be seen as advocating a crudely instrumentalist vision of education, statements of PISA's aims often conceal the economic focus that informs its overwhelming emphasis on maths, science and literacy. For example, mathematical literacy is described as comprising 'an individual's capacity to identify and understand the role mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in

¹This contrasts starkly with the focus of assessment in ancient China, where imperial civil service examinations assessed mastery of a canon of classical texts dealing with philosophy, history and what today we might call 'public administration'. But in late imperial China, as around the world today, debate raged over appropriate ways to assess such learning, with many intellectuals harshly critical of the effects of a stilted, formulaic approach to assessment (the 'eight-legged essay') on cultural and political life.

It can effectively obtain students' advantages and deficiencies in fine-grained knowledge and provide a foundation for imparting students in accordance with their aptitude and adaptive learning.

ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen' (OECD, 2003, p. 24).² We discuss the OECD's assessment activities and their implications further below.

To validate assessment outcomes across populations of subjects, an attempt is often made to anchor the assessment items on a latent scale. As a case in point, scaling with the Rasch model or Item Response Theory is often used in cross-national or cross-cultural assessments to provide evidence of the fact that test items and student abilities can be anchored on the same underlying scale (Fischer and Molenaar, 2012; De Ayala, 2013). However, this idea has also been criticized as being part of a reductionist view of education (Wu et al., 2020). Cognitive diagnosis assessment (CDA) is another newly developed assessment theory that integrates the goals of assessment in the process of cognitive models and reflects students' potential cognitive

processes through their responses to items. It can effectively obtain students' advantages and deficiencies in fine-grained knowledge and provide a foundation for imparting students in accordance with their aptitude and adaptive learning (Wu et al., 2020).

In recent years, the OECD has been expanding the scope of PISA metrics to incorporate non-cognitive skills, such as social and emotional skills, global competency, creativity and well-being (e.g. Sellar and Lingard, 2014; Grotlüschen, 2018; Auld and Morris, 2019; Rappleye et al., 2019; Li and Auld, 2020). Since 2018, PISA has assessed 'global competence' (OECD, 2016a, p. 4), defined as 'the capacity to analyze global and intercultural issues critically and from multiple perspectives, to understand how differences affect perceptions, judgments, and ideas of self and others, and to engage in open, appropriate and effective interactions with others from

²<https://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/33707192.pdf>



... OECD has been attempting to position itself as the global arbiter for monitoring education systems' performance in relation to the United Nations Sustainable Development Goals, especially SDG 4.7.

different backgrounds on the basis of a shared respect for human dignity' (*ibid*). The declared aim is to evaluate the extent to which students are prepared to act in a globalized world in terms of their skills, attitudes and knowledge (**Sälzer and Roczen, 2018**). Here the OECD has been attempting to position itself as the global arbiter for monitoring education systems' performance in relation to the United Nations (UN) Sustainable Development Goals (SDGs), especially SDG 4.7: 'education for peace, sustainable development and global citizenship' (**UNESCO MGIEP, 2017; Auld and Morris 2020**). This effectively brings the OECD into competition with UNESCO, which has traditionally adopted a more humanistic rather than human capital-oriented perspective on education. But in the process of devising ways of assessing the SDGs, 'global citizenship education' and 'education for sustainable development' (ESD) have been reframed as 'skills' or 'competencies' (**UNESCO, 2013; OECD, 2016a, 2016b**), integrating them with the established OECD

paradigm that sees learning as a process of the competitive acquisition of skills (see the discussion of social and emotional learning (SEL) (**WG2-ch8**).

This approach now extends to 'creative thinking', due to be added to the PISA assessment from 2022 and defined as the 'competence' to engage productively in the generation, evaluation and improvement of ideas that can result in original and effective solutions, advances in knowledge and impactful expressions of imagination (**Leksmono, Prihandoko and Murtikusuma, 2019**). In this regard, the OECD approach focuses on two broad thematic content areas: 'creative expression' and 'knowledge creation and creative problem solving'. 'Creative expression' refers to instances where creative thinking is involved in communicating one's inner world to others through both written and visual forms, whereas 'knowledge creation and creative problem solving' involves the investigation of open questions or problems and the generation

... assessment today is both designed and implemented at various levels – from the classroom through school, locality, nation to the cross-national level.

of solutions that are original, innovative, effective and efficient (OECD, 2019)

9.2 .3

IMPLEMENTATION OF ASSESSMENT

As the discussion of the OECD above underlines, assessment today is both designed and implemented at various levels – from the classroom through school, locality, nation to the cross-national level. Implementation at national and cross-national levels involves survey design as well as considerations of sampling, data collection and analysis. We examine further this cross-national dimension and its ideological and political dimensions later in this chapter, but it is important to bear in mind the influence of this global discourse as we consider the design and implementation of assessment at national and subnational levels.

Assessment at the individual and classroom levels can not only be implemented by the teacher but can also be accomplished by the student or their peers. Self-assessment (or assessment as learning) highlights the importance of self-monitoring processes during which students reflect on and evaluate their work or learning, judge the degree to which they reflect upon explicitly stated goals or criteria, identify strengths and weaknesses in their work, and revise accordingly (Andrade and Du, 2007). It is often suggested to be used in combination with other forms of assessment. For example, students can be required to present self-assessment in relation to previously agreed on criteria for activities such as class participation or presentation. Peer assessment is widely used in collaborative learning settings (Boud and Falchikov, 2007). It involves students providing feedback to other students on the quality of their work. The practice of peer feedback usually includes the assigning of a grade, or peer-related exchange and discussion



of student assignments (**Falchikov, 2013**). A significant amount of evidence suggests that students become more competent and gain confidence at peer and self-assessment practice (**Boud and Falchikov, 2007**). Moreover, Taras (**2010**) shows strong gains in examination scores when pupils were trained in both self and peer assessment.

The implementation of assessment is evolving rapidly with the advent of digital technology. With the aid of modern online

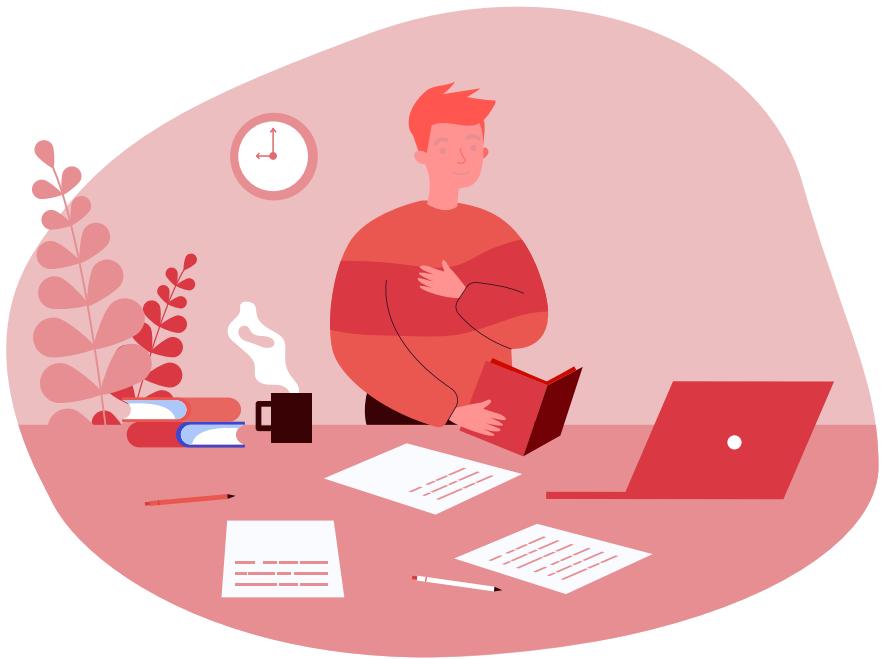
digital technology tools, including internet facilities, teleconferencing, videophones, multimedia systems and mobile technology, it is often claimed that teachers can now grade students' work quickly and easily, thereby saving more time for classroom instruction; but, in fact, pressures on teachers to be 'accountable' (and a proliferation of technologically enabled methods for enhancing 'accountability') frequently distract from engagement with students in the classroom (**Muller, 2018**). The latest technological tools notionally offer a quick

Artificial intelligence (AI) has also been hailed as promising enhanced possibilities for individualized learning and formative assessment.

assessment of students' work while providing instant feedback to students. Run by the OECD in 2018, the Teaching and Learning International Survey (TALIS) Video Study, through a direct video-recorded observation and lesson artefact collection, provides additional evidence on classroom teaching and instruction, and has been hailed as addressing the limitations of using teacher self-reported data (Ingram et al., 2020). However, the risks attached to reliance on such technology should also be clear: in some societies today, CTV cameras are becoming ubiquitous in university and school classrooms, where they serve the purpose of monitoring and controlling teachers and students. Likewise, smartphones and social media apps can be used to subject teachers to constant surveillance, either by an intrusive and controlling state, or by online mobs, or both (see **WG2-ch6 on educational technology**).

Artificial intelligence (AI) has also been hailed as promising enhanced possibilities for individualized learning and formative assessment

(UNESCO IITE, 2020). As a result of contemporary theoretical insights about teaching, learning and assessment (Gipps, 2002; Gibbs, 2006; Boud and Falchikov, 2007) as well as contemporary technological change, it is claimed that education will become more learner-centered and competence-based. But apart from the complex implications that introduction of new media may have for curriculum and pedagogy (see **WG2-ch6, WG2-ch8**), it is important to note that most developing countries are unable fully to utilize technology-enhanced approaches to assessment. Most schools in developing countries do not have a functional information communication and technology (ICT) unit; those that do are likely to be poorly equipped, while some may be equipped but are saddled with irregularities in the power supply. Furthermore, the use of digital tools for assessment can be problematic because of their reliance on decontextualized formats to assess learners' capacities with minimal room for observation of learning processes.



9.3

Assessment and context: towards a global assessment regime?

Overall, there are two major approaches to understanding the relationship between assessment and context (**Unterhalter, 2016**). The first approach conceives of context as a linear system, in which assessment functions as a means of monitoring the input and output of education. In this

essentially mechanistic approach, assessment is mainly seen as a practice designed to enhance education's role in forming productive workers. The second approach considers context as a complex system where different aspects of sociocultural, economic, political and technological factors

Results of international large-scale assessments, as represented by PISA, have emerged as a reliable proxy for a nation's stock of human capital, and, therefore, future economic competitiveness.

intertwine, and assessment has the potential to provide a space for expressing aspects of what truly matters. This second approach acknowledges the important role of assessment in measuring outcomes and enhancing productivity, but also emphasizes its implications for rights, capabilities, equalities and relationships of power within and between societies. This latter approach is exemplified by efforts by Elaine Unterhalter and colleagues³ in a project to develop an indicator framework to track aspects of gender equality in education in order to contribute to the measurement and evaluation of gender sensitive and inclusive learning environments. Through participatory discussions, the project has built on a range of research on gender, capabilities theory, education, poverty, intersectionality and inequality to develop innovative ways to evaluate gender equality in education, avoiding the limitation of relying solely on gender parity

measures. In this chapter, we also take the second approach to show how these multidimensional contextual factors shape and inform our understanding of the various forms of assessment, and their implications.

9.3 .1

GLOBAL TRENDS IN ASSESSMENT

In the context of contemporary processes of globalization and the move towards a knowledge economy, the demand for improved comparative datasets in education has brought the authority of international reference frames to governance as part of what has been termed a ‘comparative turn’ (Martens 2007). Results of international large-scale assessments (ILSAs), as represented by PISA, have emerged as a reliable proxy for a

³<https://www.gendereddata.org/>



nation's stock of human capital, and, therefore, future economic competitiveness. Statistical sophistication has been paraded as a badge of scientific rigour, with claims that ILSAs incorporating modern psychometric techniques such as item response theory (IRT) make for improved comparability of results and depth of analysis across countries (**Adams and Gonzalez, 1996**). Multilevel modelling (**Bryk and Raudenbush, 1992; Kreft et al., 1995**) and structural equation modelling (**Hayduk, 1987**) are also portrayed as having enhanced the quality, depth and accuracy of results of a wide range of assessment methods, including cognitive diagnostic analysis. Such perceptions, however, often owe much to strategic narratives promoted by powerful institutions intent on securing and expanding their influence (**Tikly, 2017; Ydesen and Grek, 2020; Auld and Morris, 2021**).

Perhaps the most globally influential of these organizations is the OECD, which is why we devote special attention to it later in this chapter. But it is first pertinent to ask what features of

our contemporary international context have contributed to a situation in which it has fallen to 'an international economic policy organization' to 'lead the charge' towards global coordination of educational measurement – and what dangers this implies (**Engel et al., 2019, p. 128**). Crucial here are political and economic conditions and the ideological climate following the end of the Cold War, discussed in **WG2-ch1** of this 'Context' report. As the discrediting of state-based 'welfarism' paved the way to the ideological dominance of neoliberal, market-based approaches to economics and public policy i.e. new public management [NPM], educational opportunity rather than redistributive taxation or direct state support came to be portrayed as the ultimate guarantor of social justice. As discussed in **WG-ch1**, the concept of 'meritocracy', originally conceived as a dystopian fantasy, has been reframed as a utopian aspiration. If only all citizens could be offered the opportunity of a decent education, success or failure could be attributed

... positive reframing of meritocracy, coinciding with the massification of higher education and changing labour market trends in many societies, has hugely raised the political stakes surrounding educational assessment.

entirely to individual effort, and state welfare provision otherwise restricted to a minimal ‘safety net’. Inequality could not only be justified ‘meritocratically’ but as a necessary spur to diligence on the part of learners and workers, and hence to economic productivity. Such, crudely put, is the essential logic of the new orthodoxy of which the OECD has become an influential exponent.

This positive reframing of meritocracy, coinciding with the massification of higher education and changing labour market trends in many societies (in turn linked to technological and economic developments discussed in **WG2-ch1**, **WG2-ch3**, **WG2-ch6**), has hugely raised the political stakes surrounding educational assessment. The belief that education holds the key both to maximizing national productivity and to distributing its benefits equitably has intensified pressure on governments to demonstrate that they can ensure delivery of a high quality of education to all their citizens. So too has the fact that, even as neoliberal

globalization eroded tariff barriers and promoted increasing cross-national regulatory alignment, education remained one area of public policy with implications for economic growth for which national states can be held entirely responsible (**Green 1997**). This does not necessarily imply direct state provision; neoliberal orthodoxy holds that the state’s functions should be essentially regulatory, establishing and policing rules to enable a smoothly functioning market to serve ‘consumers’. Since the 1990s, states have rarely divested themselves of existing public schools or colleges, but in societies where NPM has made the greatest inroads, management of these institutions has become increasingly marketized (see **WG2-ch3** on the political economy of education).

Just as the ideology of meritocracy sets an elevated premium on the measurement of learners’ performance, so marketized management practices demand detailed measurement of the value of educational ‘output’ obtained in return for a given ‘input’.



Like shareholders scrutinizing their company's annual report, taxpayers, parents and the politicians acting on their behalf (and, increasingly, private investors in the 'education industry', too) have been encouraged to demand 'accountability' from schools, teachers and educational officials, in the form of ostensibly transparent, scientific, quantifiable data.

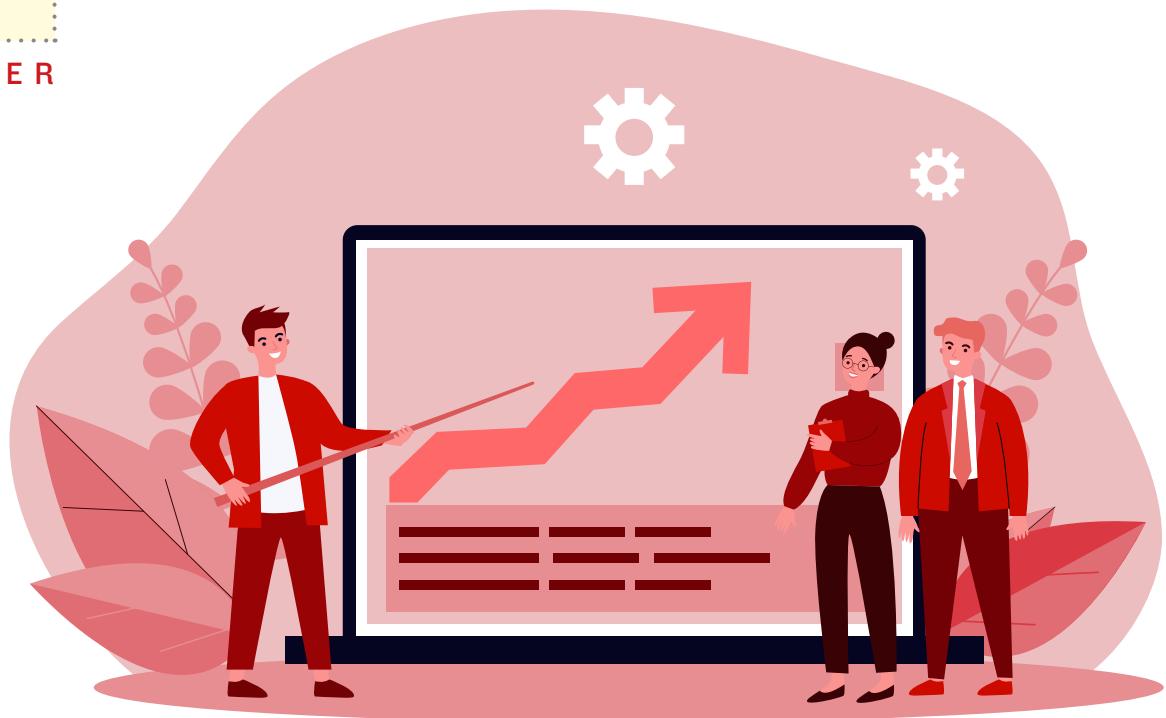
9.3 .2

TOWARDS A GLOBAL ASSESSMENT REGIME

These trends account for the huge appeal of the quantitative measurement of educational outputs offered by the OECD through its PISA tests, and for the introduction in many societies of increasingly elaborate systems of national testing. Across the English-speaking world especially,

the period since the 1980s (when the IEA introduced its Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS)) has witnessed a drive to emulate what is seen as the test-driven success of East Asian systems of schooling.⁴ Ironically, this has happened even while many East Asians themselves have voiced concerns about what they see as the excessive competitive intensity of their assessment regimes, and the effects of this – on children's stress levels, their physical and psychological health, household finances (as parents seek advantage in the race for credentials), socio-economic inequality and even decisions over fertility (**Vickers and Zeng 2017**). Legitimation for Western calls to 'look East' has come from claims for a correlation between performance in PISA tests and rates of economic growth (**Hanushek and Woessmann, 2008**), despite research demonstrating the evidential weakness of these claims

⁴Since the PISA tests began in 1997 (with the first results published in 2000), the work of the OECD in this area has increasingly overshadowed that of the IEA.



(Komatsu and Rappleye, 2017).

The early twenty-first century has thus witnessed a global intensification of assessment – not just of students and national systems of education, but also of teachers and schools (such as through PISA4U and PISA for schools) – driven fundamentally by an economic agenda that sees education as a vehicle for human capital formation. This agenda, strongly associated with the OECD, is in tension with the humanistic goals for education traditionally espoused by UNESCO. While not denying the vital economic importance

of education, in a series of major reports over its seventy-year history, UNESCO has elaborated a broader vision encompassing the intrinsic, as well as instrumental, relationship of learning to human fulfilment, the role of education in preparing students for active citizenship, and the promotion of tolerance and international understanding.

In recent years, however, there has been an increasing bending or enmeshing of these distinct economic and humanistic positions. On the one hand, in its educational work, UNESCO has come under growing pressure



The early twenty-first century has thus witnessed a global intensification of assessment – not just of students and national systems of education, but also of teachers and schools.

to demonstrate engagement with the hard-nosed world of statistical data, performance indicators and ostensibly ‘scientific’ analysis of educational inputs and outputs in the OECD mould (**Elfert, 2018**). Conversely, the OECD has responded to international calls, formalized in SDG 4.7, for education to promote ‘peace, sustainable development and global citizenship’, by devising new ways to define, quantify and measure ‘global competencies’ portrayed as promoting these goals (see **WG2-ch8** for discussion of SEL in the context of curriculum). The relentless drive to quantify and measure, allied to the reframing of the socializing and humanistic aspects of learning as ‘skills’, enables talk of education’s role in promoting ‘sustainability’ and ‘global citizenship’ to be subsumed within a human capital formation discourse, effectively deflecting criticism of what remain its fundamentally economicistic premises (**Auld and Morris, 2021**).

Meanwhile, technological change, including AI and machine

learning, have influenced our understanding of various aspects of education and learning, including the potential for expanding and refining assessment techniques. Assessment is increasingly digitized, with the prospect of rendering it more adaptive to individual learning differences. So far, however, many experiments with online assessment have only changed the way of presenting the assignment by moving the questions from paper to screen and changing the assessors from teachers to machines (**Wu et al., 2020**). The implications of such ‘mechanization’ for the social or socializing functions of education, in the form of human interaction between teachers and students, and amongst students themselves, require careful consideration (**Williamson, 2017**). The urgent need for critical analysis of the potential and risks of a proliferating use of technology in assessment as well as teaching and learning has been heightened by the rapid expansion of online modes of educational delivery during the COVID-19 pandemic (see **WG2-ch1, WG2-ch6, WG2-ch10**).



9.4

Place of science and evidence in assessment

The perceived validity of assessment procedures depends on claims to some sort of scientific and evidential basis, although definitions of what constitutes ‘science’ and ‘evidence’ can vary widely (Mislevy, 1994; Mislevy and Haertel, 2006; Hunsley and Mash, 2007; Pellegrino, Chudowsky and Glaser, 2001; Bennett, 2015). Taking a transformative perspective, the key question is how we can validate the outcomes of the assessment of aspects of child functioning. Therefore, implicit choices need to be made regarding what counts as ‘evidence’ based on claims that can be made from ‘science’. Over

recent decades, studies from the field of educational neuroscience (EN) have come to play an increasingly prominent role in public debate over assessment and education more generally around the world. It is therefore important to analyse not only the evidential basis for the claims advanced by neuroscientific research, but also the contextual factors that have influenced growing public interest in the application of neuroscience to educational assessment – and what this implies for assumptions about the nature and purpose of education.



9.4 .1

IMPACT OF RESEARCH INTO EDUCATION AND LEARNING FROM A NATURAL SCIENCE PERSPECTIVE

Science and evidence have been hailed as foundational pillars of twenty-first-century education driven by the notion that empirical evidence is an ‘efficient indicator of knowledge and learning’ (**Wiseman, 2010**). EN, in particular, has emerged as a significant player in the field of science and evidence-based educational practices fuelled by the idea, as stated by Koizumi (2004), that education, aptly defined, is a ‘nurturing of the brain’ (**Howard-Jones, 2008**). Within the broader field of mind, brain and education (MBE), EN aims to use evidence from neural mechanisms of learning to optimize educational practices and policies.

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to optimize educational practices and policies. It has been claimed that the possibilities afforded by neuroscience in learning offer great opportunities, although advocates stress that its applications should be specific and supported by well-controlled experimental data that can be translated to classroom environments with success (**Wolfe and Brandt, 1998; Geake, 2008**). EN has been portrayed as supporting the ‘constructivist model’ of education (typically associated with the ‘formative’ approach to assessment) where students should be engaged actively in the learning process and have an agency to guide their learning (**Caine and Caine, 1991; Sylvester, 1995; Jensen, 2005**). EN has provided biological support to several psychological theories on learning but it is sometimes argued that the lack of specificity makes it difficult to translate such biological findings into classroom settings (**Bruer, 1997, 1999, 2016**). Direct solutions to learning-related real-world problems, faced in the classroom, have been lacking and it is likely that neuroscience alone cannot provide such direct solutions.

Furthermore, there are known methodological issues in the field of cognitive neuroscience that can extend to EN if proper vigilance to confirmation bias is not undertaken at policy levels, that is, focus should be on assessing results on the basis of sample and/or effect sizes and be wary of over promises based on correlation results and low replication rates (**Yarkoni, 2009; Poldrack, 2012; Barch and Yarkoni, 2013; Button et al., 2013; Szucs and Ioannidis, 2017, 2020; Turner et al., 2018; Huber, Potter and Huszar, 2019**). Before adopting any brain-related evidence at the policy level, it is important to ensure that EN is able to address a specific problem; it should also be tested in large-scale student populations, and replicated.

In an early example of a successful EN application, functional neuroimaging of younger students was found to require increased working memory and attentional resources to perform mathematical operations at the same accuracy levels as older students (**Rivera et al., 2005**). The information that younger and older students differ



in the cognitive resources used to perform arithmetic could, in turn, help teachers in the classroom, to design different teaching strategies for students based on their age. In the above example, neuroscience findings (e.g. brain activations) were used to study behaviour (mathematical problem-solving), establishing an indirect link between neuroscience and classroom learning strategies. However, direct links between neuroscience and learning can also be studied, for example, the impact of different variables like metabolism, exercise, nutrition, stress hormones or environmental pollutants on brain function in areas important in learning can be studied without behavioural assessment (Sigman et al., 2014; Feiler and Stabio, 2018; Thomas, Ansari and Knowland, 2019). In a similar vein, neuromodulation can be used to assess several contextual factors in its usage, for example, inequalities in education, biology

is merely the substrate on which social and cultural contexts act to cause changes (see **WG3-ch5** for a discussion on ‘Foundational language skills for literacy’). For policy decisions and practices stemming from EN to be successful, integration of sociocultural context is of great importance; for what we learn from EN studies in Western, Educated, Industrialized, Rich and Democratic (WEIRD) (Henrich, Heine and Norenzayan, 2010) nations cannot be successfully implemented in the rest of the world without context-dependent adaptations (see **WG2-ch7** on critical challenges in EN).

9.4 .2

SCIENCE-BASED RESEARCH AND FORMATIVE ASSESSMENT

Naturally, at all education levels, understanding students’ learning

In a similar vein, neuromodulation can be used to assess several contextual factors in its usage, for example, inequalities in education.

Considering the importance of formative assessments in student learning and academic progress, designing optimal assessment programmes is a key concern.

profiles and their repertoire of learning strategies is of great importance. It allows the teacher to remain informed about the students' baseline, progress and process of learning. Formative assessment programmes seek to allow teachers to appraise exactly this – how well the student is performing on a path to reach intended goals. This should be distinguished from a formative assessment that uses judgements about how to improve programme effects (OECD, 2005). Considering the importance of formative assessments in student learning and academic progress, designing optimal assessment programmes is a key concern. Behavioural, psychological and neural data from EN studies can provide a vital understanding of the mechanisms underlying learning strategies and contribute to the design of successful formative assessment programmes. Learning begins as an amalgamation of several interactive and multidimensional cognitive processes that are essential for academic as well as lifelong learning, including working memory, motivation,

reward, selective attention, visual and auditory processes, executive functions, emotion regulation, awareness and reflection (Bunge and Souza, 2009; Price, 2012; Menon, 2015; Florensa, Duan and Abbeel, 2017). Neuroscientists stress that understanding the underlying basis of the interaction between learning and context can help educators and teachers guide the contextual learning environment to affect biological changes towards intended learning outcomes. However, it is not straightforward to translate neuroscience findings into instructional practices that improve learning outcomes (Bowers, 2016a), and for the field of EN to demonstrate a meaningful contribution to improving learning would require concerted efforts between different stakeholders (Smeysters, 2016; Thomas, Ansari and Knowland, 2019).

Although it is claimed that the future of the EN field opens up several promising avenues to inform teaching practices and, in some instances, redefine educational frameworks (Shore



... insights from neuroscience are used to make formative assessment tools more adaptive to identify both the differences in students' learning processes and the necessary instructions required to bridge any gap in such processes.

and Bryant, 2011; Smedt, 2018), for EN findings to deliver on their promise and be translated to real-world large-scale classroom practices, lab-based experiments need to be adapted accordingly and replicated rigorously (Seghier, Fahim and Habak, 2019). A related major finding from EN is the evidence of 'individual differences' in brain-behaviour processes in learning underlying the complex issue of generalizing the applicability of EN findings over large groups (Posner and Rothbart, 2009). In past decades, the OECD has been interested in the application of findings from EN. At an individual level, insights from neuroscience are used to make formative assessment tools more adaptive to identify both the differences in students' learning processes and the necessary instructions required to bridge any gap in such processes (OECD, 2006; WG3-ch3). It is argued that neuroscience methods can be applied to individual learners to grasp their depth of learning and emotion regulation capabilities, and with intelligent designing, such individual focus

can provide powerful diagnostic tools for formative assessment and personalized learning (OECD, 2007, p. 156). Indeed, there is neuroscientific evidence that a large number of brain networks function in an overlapping and dynamic manner to bring about learning and skill acquisition in different domains of knowledge, ranging from academic disciplines to social and emotional learning (SEL) (Thomas, Ansari and Knowland, 2019; Dahl, Wilson-Mendenhall and Davidson, 2020). However, it should be noted that more research is needed to establish whether such findings can ultimately validate the claims the OECD has made as regards the potential of EN in educational assessment (see WG2-ch7 and WG3-ch3 for discussion on 'Why neuroscience is relevant to education').

Learning can generally be categorized according to its nature, perceptibility and level of depth (Rogiers, Merchie and Keer, 2019). As the learner becomes more advanced, the depth of previously learned skills influences the ongoing learning process at

...literacy can be achieved through different developmental pathways and across the lifespan, thus helping in building different learning assessment tools and teaching instructions for children, adolescents and adults.

both the cognitive and neural levels (**Hinton, Miyamoto and Della-Chiesa, 2008**). Repeated testing and delayed feedback has been shown to increase long-term memory retention of newly studied text both in lab-based and classroom environments (**Dunlosky and Nelson, 1992; Roediger and Karpicke, 2006a, 2006b**) underlying the importance of continuous formative assessment in student learning, recall and overall academic achievement (**Ozan and Kinçal, 2018**). Educators have also advocated for dynamic testing (feedback while the test is being conducted) as a better means for assessing students' strengths, weaknesses and learning potential in different cognitive domains when compared to static testing (**Grigorenko and Sternberg, 1998; Sternberg and Grigorenko, 2001, 2002**). This makes dynamic testing and formative assessment (an assessment method that embodies the idea of continuous as well as dynamic testing) one of the testing methods that promotes learning and not just test learning. EN has also helped in rejecting the neuromyth of 'critical periods' of learning

with the more appropriate 'sensitive periods' in learning (**OECD, 2007, p. 122**). This has led to the understanding that literacy can be achieved through different developmental pathways and across the lifespan, thus helping build different learning assessment tools and teaching instructions for children, adolescents and adults (**Frith et al., 2011; Parisi et al., 2019; also see Meltzoff et al., 2009; Varma, McCandliss and Schwartz, 2008; WG2-ch7 and WG3-ch3 for further reading on EN**).

9.4 .3

SCIENCE-BASED RESEARCH AND SUMMATIVE ASSESSMENT

Summative assessment assesses student learning at different stages of the education timeline and provides for a learner's accountability. Summative assessment mostly uses



NAPLAN and similar standardized tests, which are highly consequential, have faced significant criticism due to their aim to assess student learning in a very short time but with results that have significant ramifications.

standardized tests to measure student learning, and high-stakes examinations used as summative assessment tools might have life-changing consequences on a learner's education profile going forward. For example, NAPLAN scores in Australia, a score derived from summative assessment, determine federal funding for schools, exert a significant effect on learners' future educational opportunities and might also be linked to teacher pay (Ford, 2013; Harris et al., 2013; Smith, Parr and Muhidin, 2019). NAPLAN and similar standardized tests, which are highly consequential, have faced significant criticism due to their aim to assess student learning in a very short time but with results that have significant ramifications. The current discussion on summative assessments raises questions of how, where and what is being assessed. And if standardized tests are true predictors of human flourishing. Innovative research in brain sciences might provide answers to some of these questions. Research from EN and social

sciences show that individual differences in biology, as well as sociocultural factors, play a key role in determining different levels of learning, that is, there are multiple ways of knowing (Thomas, Ansari and Knowland, 2019; Dahl, Wilson-Mendenhall and Davidson, 2020; WG3-ch2, WG3-ch3). This raises the question whether standardized tests can completely assess the learning abilities and outcomes of a diverse student population. Additionally, the biological response to stress while undertaking high-stakes anxiety-inducing assessment might play a major role in determining assessment scores.

The OECD introduced collaborative problem solving (CPS) in the assessment protocol of its PISA tests in 2015 (Mo, 2017) on the basis that CPS had been shown to help develop effective pedagogical strategies and learning technologies (Law and Tsang, 2019, p. 165). The PISA framework assesses two dimensions, cognitive and collaborative processes, required for CPS. In the PISA CPS assessment, each student

Children are the heir to the social, moral and ethical responsibilities of the global future.

interacts with a computer agent to complete the assessment. In the collaborative setting of CPS, the social and cognitive processes are assessed as different domains required for achieving CPS successfully. However, it is unlikely that at the neural level these two domains are activated independently of each other and more likely that social and cognitive brain networks interact to bring about CPS. Findings from developmental neuroscience can inform the trajectories of development in the social and cognitive processes in the developing brain (**WG3-ch2**).

9.4 .4

TOWARDS A SCIENTIFIC WINDOW ON CHILD FLOURISHING

Children are the heir to the social, moral and ethical responsibilities of the global future. To fulfill the

responsibilities of their future role, not just as human capital in economic developments, but as gatekeepers of the planet's health and well-being, there is growing consensus that childhood education needs to be grounded in principles that lead to human flourishing. The current generation of children faces several critical issues globally that threaten their future health and flourishing, including, but not limited to 'Climate change, ecological degradation, migrating populations, conflict, pervasive inequalities, and predatory commercial practices' (**Clark et al., 2020**). One of the aims of future educational frameworks is to create learning environments that promote childhood flourishing that can build towards a resilient future generation capable of countering and adapting to these growing threats and fulfill their shared global responsibilities. The context of the evolved developmental niche plays a pivotal role in the successful learning of SEL. A classroom that is positive, congenial, empathic and stimulating is a necessity for



achieving these skills. Conversely, a stressful environment can result in the activation of the biological stress cycle that can eventually lead to reduced social-emotional and academic performance.

Negative emotions such as anxiety and stress, often associated with language acquisition or mathematics learning, can be regulated through programmes focusing on SEL (**Dresser, 2012; WG3-ch4**).

A universal educational framework focused on childhood flourishing must not only be limited to academic knowledge acquisition and performance achievements but constitute learning of adaptive and positive social and emotional responses that are prerequisite to childhood well-being and good academic

performance. Several developing brain networks are implicated in the cognitive processing of the different domains of SEL (**Dahl Wilson-Mendenhall and Davidson, 2020**). Childhood flourishing is achieved when a child can realize their full potential related to cognition, social and emotional interaction, and linguistic and motor skills (**WHO, 2018, p. 83**). In the classroom environment, the focus should be on building and maintaining social relationships, recognizing emotions in self and others, regulating strong emotions, making responsible decisions, having self-agency, developing effective and collaborative problem-solving skills and making empathic responses (**Committee for Children, 2019**). Both proximal forces like maternal health and early caregiver-child relationships,

... it has been observed that cultural traits that allow human flourishing co-evolve with biology and shape biological affordances.

and, distal forces including culture, politics, ideology, pandemics, economics and, increasingly, the climate (**Watts et al., 2019; Black, Lutter and Trude, 2020**) contribute significantly to the development of either adaptive or maladaptive social-emotional responses at the neurological and behavioural levels (**Gleason and Narvaez, 2019**).

Considering culture as a context in which SEL takes place, it has been observed that cultural traits that allow human flourishing co-evolve with biology and shape biological affordances (**Aggarwal, 2013**). For example, basic emotions and the social construction of emotions are represented by the dual processes of genetic and cultural inheritances (**Chiao, 2015**). Studies in cultural neuroscience have used transcultural neuroimaging (**Han and Northoff, 2008**) to show that there is a 'looping effect' in the dynamic interplay between culture and biology (**Vogeley and Roepstorff, 2009**). Using cultural neuroscience as a tool to understand how emotion recognition varies across cultures, Chiao and colleagues

(**2008**) showed that the amygdala, the area primarily involved in the processing of emotions and memories associated with fear, preferentially reacts to culturally congruent fearful faces compared to culturally incongruent fearful faces. Systematic and effective assessment procedures, as implemented by formative assessment, should be carried out regularly for monitoring and evaluation of the successful implementation of educational programmes with a focus on child flourishing (**Ferreira, Martinsone and Talic, 2020**).

9.4 .5

SCIENCE AND EVIDENCE-BASED POLICY AND PRACTICE

As noted above, an intensified focus on the role of science and evidence in education was rooted in concerns over the ability of



However, the rigour of statistics and evidence of ‘what is impactful’ has resulted in exclusion criteria that reject impactful interventions where such statistical significance is difficult to demonstrate.

education in preparing future citizens who can maximize financial outcomes based on HCT and address inequities in quality education (**Bennet and Gitomer, 2009**). In the United States (USA), the No Child Left Behind Act (NCLB Act) of 2001 was one of the first policies that prioritized the role of randomized studies and ‘scientific evidence’ in data-based policy decision-making. In the next two decades, the relevance of science and evidence in education policies (particularly, in middle- and high-income societies) has been growing steadily (**Ross and Morrison, 2020**). Results from the OECD’s PISA (**OECD, 2006**), which reported below-average performance of US students in comparison to other industrialized nations with whom the USA competes at an economic level (**Lemke et al., 2004**), was a major driving force for the emergence of evidence-based policy decisions in the USA. The 2015 Every Student Succeeds Act focused on raising the standards of research-derived scientific evidence required to evaluate the education programmes of schools. As Ross and Morrison

(**2020**) point out, this focus on science and evidence on evaluation has resulted in an evidence-based back-up of assessment tools, such as consumer access to evidence databases and supporting intervention programmes that are backed by evidence for funding. However, the rigour of statistics and evidence of ‘what is impactful’ has resulted in exclusion criteria that reject impactful interventions where such statistical significance is difficult to demonstrate (**Asen et al., 2013**). For example, growth in academic performance following goal-directed interventions is easier to achieve in terms of statistical significance than intervention programmes that focus on SEL, although the importance of the latter in lifelong success is well documented (**Zins and Elias, 2007; Morrison, Ross and Reilly, 2019**). (Also see Farley-Ripple et al. [**2018**], on how scientific evidence might be used in policy decision-making). In their case study report on the ‘technology diffusion’ initiative, Ross and Morrison (**2020**) also observe the changing attitudes of stakeholders across the cross-section of the initiative timeline.

... policy decisions that incentivize teachers solely based on academic testing scores can deny funding and undertaking of classroom research that do not follow the ambitions of student test scores.

The increase in digital comfort and skill development, though initially appreciated, became less relevant for stakeholders over time; the primary focus was pivoted towards the programme's efficacy concerning educational achievement, raising questions about the intended outcomes of educational initiatives beyond academic performance.

Specific to the role of neuroscience in education policy decision-making, Shore and Bryant (2011) advise educational policy-makers to focus on policies that can redefine classroom practices that might limit the use of neuroscience findings. One of the significant findings from biology has shown the importance of positive, congenial and empathetic learning environments in learning and academic performance (Kort, Reilly and Picard, 2001; Jensen, 2005; Sousa, 2006). It was observed that a stern and/or low-quality learning environment results in increased stress levels and consequently higher levels of the stress hormones adrenaline and cortisol. This increase in stress hormones acts on specific brain networks, resulting in negative

emotions and reduced EF, both of which significantly impede effective learning and academic performances (see WG2-ch5 for further discussion on the biological response to stress and its effect on learning). Along with the findings of social and emotional contexts that act on the brain to mediate learning (Dirkx, 2008; Hinton, Miyamoto and Della-Chiesa, 2008; King and Chen, 2019; WG2-ch4), these findings have provided meaningful evidence on how educational policy and practices must be shaped to create positive learning environments. However, Geake (2008) reminds us that neuroscience findings in lab-based experiments by themselves might not be relevant to education and teaching practices; instead real-world implementation providing 'a stronger rationale as to why particular styles of teaching and certain strategies are more effective in reading and writing, for example than others' is required. Jalongo (2008) also discusses the role that economics and politics play in prioritizing one set of findings over another. Additionally, policy decisions that incentivize teachers solely based on academic testing scores can deny funding and



Education policy-makers must consider conducting studies and adapting study designs in reference to the cultural context to design successful assessments.

undertaking of classroom research that do not follow the ambitions of student test scores (**Farstrup and Samuels, 2002**). This same complex dynamic between scientific evidence and politics also comes into play in sanctioning or subverting the use of neuroscience findings in educational policy. The decision is often based on individual biases within the political system and not on the robustness, technical merit or utility of the conducted research (**Britto, Cerezo and Ogbunugafor, 2008**).

The growing role of neuroscience in policy decision-making has not been limited to the USA. Several initiatives across different nations, for example, the United Kingdom (UK), France, Denmark, Australia and Singapore, have been implemented to integrate neuroscience with policy across different fields including military, law and education (**Pykett, 2015**). However, beyond the developed nations, world-governing bodies like the UN and the World Bank have also invested in developing a framework for policy programmes influenced by neuroscientific evidence. From this perspective,

Hinton, Miyamoto and Della-Chiesa (**2008**) have laid down a few important points for brain-informed education policy implications for consideration by education policy-makers including a) building towards rich learning environments, b) embedding guidelines for formative assessment into the curriculum to help spur ability growth, c) considering the interplay between emotion and learning, d) considering sensitive periods for language learning and, e) considering neuroscience findings to inform reading and mathematics instruction. However, the role of cultural context is often ignored when considering educational policy implications. EN research still has a great deal to accomplish when it comes to comparing and contrasting findings across different cultures. Findings from one culture might not be transferable to other cultures (**Zhou and Fischer, 2013**). Education policy-makers must consider conducting studies and adapting study designs in reference to the cultural context to design successful assessments.



9.5

Assessment and ideology

The preceding section reflects views of the relationship

between context and educational assessment from the perspective of



... assessment is not just a value-neutral instrument for promoting and calibrating effective learning; it also functions as a tool of political and social control, in ways that go unrecognized in much public debate over education.

the laboratory-based scientist. But whereas scientists or engineers may approach contextual factors as so much grit or oil in the assessment machinery, obstructing or facilitating its efficient operation, sociologists, historians or philosophers are typically inclined to ask: who has designed that machinery, with what purposes, in whose interests, and with what effects? As numerous citations in the previous section illustrate, the OECD has played a leading role in promoting the potential of EN, despite the fact that many of the claims made for the significance of neuroscientific research rest on faith in future ‘promise’, rather than on already existing evidence of its capacity to transform the assessment of learning. The OECD appears animated by the hope that neuroscience can supply an armoury of scientifically based interventions calculated to maximize the efficiency of the learning process (and hence the productivity and adaptability of future worker-citizens worldwide), but that hope itself can be considered a reflection of a profoundly individualistic, human

capital-oriented conception of the purposes of education.

Assessment, in other words, cannot be understood apart from its ideological, political and cultural context. As noted at the beginning of this chapter, assessment is not just a value-neutral instrument for promoting and calibrating effective learning; it also functions as a tool of political and social control, in ways that go unrecognized in much public debate over education. And to the extent that scientific and technological advances expand and refine the range of assessment techniques available to state and corporate actors, this can be (and, in some societies, is already proving) not liberating and empowering, but profoundly detrimental to the capacity of citizens to live dignified, fulfilling lives. How new approaches to assessment are deployed, and with what effects, has far more to do with politics, culture and vested interests than with purportedly objective ‘science and evidence’.

BOX 1

9.5 .1

A notable example of how policy-makers can be lured (or bamboozled) by scientific claims is the fiasco that occurred in the UK in the summer of 2020 when, having cancelled regular public examinations because of COVID-19, the government decided to assess students on the basis of teachers' predicted grades adjusted by algorithms. Ministers had apparently assumed that 'algorithms' were, by definition, scientific and objective, without understanding that an algorithm is only as sound as the assumptions made by the programmers who designed it. When results were released in July that year, they were greeted by a wave of protest as students, parents and teachers pointed to numerous examples of seemingly arbitrary regrading, and the government was forced to backtrack, abandoning the use of the algorithm.

SOCIOCULTURAL AND POLITICAL ARGUMENTS

'Culture', like 'context', is a concept subject to widely differing interpretations by researchers of different disciplinary backgrounds (or, indeed, disciplinary cultures). In much of the literature concerning assessment emanating from the OECD, reflecting the statisticians, 'thirst for reliable metrics', culture tends to feature as one among a number of 'factors' to be taken into account in ensuring the universal applicability of an assessment regime. But an historian, anthropologist or comparative social scientist is more likely to see culture not merely as a factor or set of factors influencing how effectively students learn, but as an ethical and philosophical framework shaping assumptions about what is worth learning in the first place (see **WG2-ch8** for discussions on curriculum and pedagogy) (Alexander, 2000).



An approach to culture that aligns with or reflects some of the assumptions informing ambitious, cross-national projects of educational assessment is ‘world culture theory’. This theory posits that as modernity, and modern education systems, proliferate around the world, educational ideas, practices and institutions are increasingly converging upon a single global model. As evidence, world culture theorists frequently point to the similarity of school timetables and curricular categories in different countries (**Meyer, Kamens and Benavot, 1992**). However, critics have pointed out that, once one opens school textbooks or enters classrooms in different countries, the ways in which ostensibly similar terms or concepts are interpreted in practice widely differ (**Carney, Rappleye and Silova, 2012**). There is, in fact, no convincing evidence of worldwide convergence in our culturally-informed assumptions about what education is, or should be, for, and how teaching and learning should be conducted.

At the same time, there are dangers in overstating the extent or immutability of cultural differences. Cultures are not immutable essences attached to eternally fixed human communities, but evolve in complex relationships with the political, cultural and socio-economic forces at work within any community or society, and beyond it, in its interactions with the wider world. The idea that any particular community possesses an entirely unique and incommensurable cultural identity that precludes meaningful comparison with, or borrowing from, other communities is a fallacy frequently invoked by authoritarian rulers to delegitimize and stifle dissent. The Indian thinker Amartya Sen has dubbed this ‘the Lee thesis’, after the late Singaporean elder statesman Lee Kuan Yew, who was fond of invoking the nebulous concept of ‘Asian values’ to justify his idiosyncratic interpretation of democracy and civil liberties (**Sen, 1999**). Culture, then, is vitally important, but its importance needs to be understood

Cultural sensitivity in educational debate is important...to ensure respect for, and enhancement of, the agency of underprivileged and disempowered communities.

in historical and political contexts. Cultural sensitivity in educational debate is important not in order to avoid offending autocrats, but to ensure respect for, and enhancement of, the agency of underprivileged and disempowered communities. As the discussion below of Africa and PISA in low- and middle-income countries illustrates, this has emerged as a key challenge for ILSAs.

A number of researchers have invoked the concept of ‘indigenous education’ to signify their recognition of how ILSAs such as PISA struggle to encompass or account for the cultural differences that underlie the enormous variation in educational beliefs, practices and institutions (e.g. **Gohl, Gohl and Wolf, 2009; Brock-Utne 2016**). Indigenous education and assessment align with twenty-first century skills by involving teachers and students as co-constructors of education and valuing the interconnectedness of content and context (**Munroe and Toney, 2013**). Therefore, the inclusion of indigenous education

and assessment procedures requires acknowledgement of the existence of a multiplicity of forms of knowledge rather than a particular ‘standard’ benchmark system often put forward by the West. For example, cultural and social norms affect how test-takers comprehend and interpret the wording of the questions contained in the tests. And correspondingly, how the learners make sense of the test items can be influenced by the values, beliefs, experiences, communication patterns, teaching and learning styles, and epistemologies of the cultural values inherent in their societies (**Solano-Flores and Nelson-Barber, 2001**).

9.5 .2

ASSESSMENT AND HUMAN CAPITAL

As noted in previous chapters (**WG2-chs1--3**), discussions of assessment results often implicitly



ILSAs such as PISA struggle to encompass or account for the cultural differences that underlie the enormous variation in educational beliefs, practices and institutions. Indigenous education and assessment align with twenty-first century skills by involving teachers and students as co-constructors of education and valuing the interconnectedness of content and context.

or explicitly frame education as an investment in human capital to promote economic development. Conventional HCT asserts that the education level of a country is an important factor for explaining national economic growth (Schultz, 1961, 1971; Becker, 1964). Unlike traditional factors (such as labour and land), human capital – pertaining to the knowledge and skills workers have acquired as a result of education – contributes to productivity and thereby to earnings at an individual and collective level. The increase in human capital stock thus leads to economic growth.

While early estimates have mainly used school attainment (or years of schooling) as measures of human capital (e.g. Mincer, 1974; Psacharopolous, 1994; Psacharopolous and Patrinos, 2004), more recent studies have turned the focus to cognitive skills and to the use of ILSA scores to arrive at more accurate measures of human capital. In particular, economists Eric Hanushek and Ludger Woessmann have introduced PISA test-score measures into

growth regressions, arguing that the achievement measure is substantially more positively associated with economic growth than the attainment measure.

For instance, [a]fter controlling for the initial level of GDP per capita and for years of schooling, the test-score measure features a statistically significant effect on the growth of real GDP per capita in 1960–2000. According to this specification, test scores that are larger by one standard deviation (measured at the student level across all OECD countries in PISA) are associated with an average annual growth rate in GDP per capita that is two percentage points higher over the whole forty-year period. (Hanushek and Woessmann, 2008, p. 638)

For a long time, international development agencies have pursued the expansion of schooling as a primary component of development (Mundy, 1998, 2006). The evidence that Hanushek and Woessmann (2008) provide seems to speak to the significance

of cognitive skills and of improvement and measurement of learning outcomes. This goes a long way toward explaining why key agencies, such as the World Bank and the OECD, in addition to extending their influence and power (see further discussions below), have come to prioritize the use of ILSAs to gauge learning and drive development in low- and middle-income countries.

While this cognitive-economic model based on international educational performance data has been much debated and critiqued in the academic literature (e.g. **Komatsu and Rappleye, 2017, 2019; Feniger and Atia, 2019; Patel and Sandefur, 2020**), it continues to gain momentum. Klees (2016, p. 644) comments that it ‘has been ubiquitous and widely accepted as an important mechanism for educational planning, evaluation, and policy making’. The result has been that ‘earlier uncertainties about how education works, how it impacts society, and how to best allocate scarce resources are being quickly replaced by contemporary certainties that raising test scores

will result in higher levels of economic growth (GDP)’ (**Komatsu and Rappleye, 2017, p. 1**).

9.5 .3

GLOBAL ASSESSMENT AND IDEOLOGY

As **WG2-ch2** has emphasized, a key challenge for educators and education policy-makers today is the absence of an ethical and political vision of education that supports a transition towards a more equitable and sustainable world (see **Beech and Rizvi, 2017**). The emphases or biases of our assessment regimes are a key part of this problem. A dominant conception of education that sees it above all as an instrument for maximizing human capital formation is associated with an approach to assessment conceptualized as the summative evaluation of knowledge and skills above all in the fields of literacy, mathematics and science. Assessment of education at



national and cross-national levels has increasingly been reduced to children's profiles of scores on standardized tests in these areas of knowledge. While these subjects are considered most relevant to ensuring readiness for employment, knowledge in these areas is also relatively susceptible to quantitative measurement, and relatively (though far from entirely) comparable across systemic and cultural boundaries.

However, the focus of political and media attention on the results of tests of these more readily 'testable' knowledge domains can lead to neglect and marginalization of other subjects that matter, such as the arts, humanities, physical education and social skills. Even more important is the notion that assessment should not involve the evaluation of a series of disciplinary subjects, but the human subject itself. Therefore, there is the need to focus not only on cognitive targets aiming at what students learn but also on ontological targets aiming at what students become (**Dewey, 1923**). In this respect, a

distinction can be made between mimetic and transformative educational traditions (**Jackson, 1986**). Mimetic traditions relate to the transmission of factual and procedural knowledge, whereas transformative traditions relate to the transformation of one kind to another in the person being taught. In future assessment protocols, it is important that these two traditions are reconciled to contribute to the social transformation of the next generation of children.

Insight into ideological aspects of assessment in education at a global level can be better understood from local case studies. Therefore, we focus on assessment and ideology in two major parts of the world: China and Africa. China's long history of examinations has already been noted above, and high-stakes public examinations, notably the National College Entrance Exam (**NCEE, known as Gaokao**), play a crucial role in underpinning perceptions of justice in the distribution of social opportunity. The recent reform of Gaokao has attempted to offer

India withdrew from PISA in 2009 after performing poorly and claimed that the test had not been sufficiently contextualized.

the rights to choose examination subjects for students in order to promote their personalized development. However, it should be noted that such reforms reflect how examinations in China may serve as sites of struggle against widespread sociocultural beliefs, as the communist regime seeks to use assessment to reinforce and legitimate its authority. Recent work on the politics of assessment in China characterizes the regime as an 'Assessment State' which uses increasingly sophisticated techniques of monitoring, surveillance and assessment of adults, as well as children, to accomplish hierarchical reordering of society (Wan and Vickers, 2021). It differs from Africa, where most local authorities are endeavouring to liberate themselves from the shackles of their colonial masters (Unterhalter, 2009). For example, Brock-Utne (2016, p. 40) notes that educational researchers 'have been constantly debating what quality in education may mean in their own context and how it should be assessed'. She suggests that, in order for Africa to build up an education system that

adheres to their own values (e.g. care for others and cooperation), 'it is critical both to teach in the languages learners speak and understand and to avoid the Western testing regime' (2016, p. 41). It is suggested that the world intellectual community and major development agencies accord some forms of recognition to African Indigenous education and assessment (Obanya, 2007, p. 25).

9.5 .4

THE OECD AND THE EMERGENCE OF A GLOBAL ASSESSMENT REGIME

Since PISA was first conducted in 1997, it has received considerable media coverage and attention from politicians and policy-makers in many nations. And as it continues to expand, the OECD has become a recognized global provider of technical expertise in the measurement of schooling



...many scholars have argued that the challenges that low- and middle-income countries faced in engaging with PISA have not been resolved by PISA-D.

performance in both member and non-member nations. With the introduction by UNESCO of the global education agenda in 2015, which identified minimum standards of quality for all countries to be delivered by 2030, the OECD has sought to promote PISA as the universal learning metric. The intent of the OECD is to have 170 nations participate in PISA by 2030, and the means to achieve this is the programme called PISA for Development (PISA-D). Whilst the OECD has enrolled a few low- and middle-income countries to join PISA in the past decade, it also faces significant challenges in these contexts (Carr-Hill, 2015; Lockheed, Prokic-Breuer and Shadrova, 2015). For example, India withdrew from PISA in 2009 after performing poorly and claimed that the test had not been sufficiently contextualized (see Edwards, 2019). Thus, the OECD, in late 2013, introduced PISA-D to make PISA more accessible and relevant by extending the PISA test instruments to ensure wider coverage in performance levels, developing contextual

questionnaires to effectively capture diverse conditions, and establishing approaches to include out-of-school youth in the assessments (Adams and Cresswell, 2016). Whilst the initiative was portrayed as helping to identify how PISA could best support evidence-based policy-making in developing societies and contribute to the monitoring of SDG 4 targets and indicators, specifically those related to learning outcomes, many scholars have argued that the challenges that low- and middle-income countries faced in engaging with PISA have not been resolved by PISA-D (see Brock-Utne, 2016; Kaess, 2018; Auld, Li and Morris, 2020; Li, 2021; Rutkowski and Rutkowski, 2021). Moreover, it is also too early to judge whether PISA-D findings will contribute to reforms aimed at improving the quality of learning in the participating countries.

In addition to the above, PISA for Schools has been introduced as an attempt to extend the relevance of PISA and the reach of the OECD into local school practices (Lewis, 2017). This alternative

... participation in PISA by developing countries is driven by the motive to be put on the global education map, a decision primarily driven by political reasoning.

framework assesses not only school performance in reading, mathematics and science against international schooling systems, but also promotes examples of best practice from world-class schooling systems and, in turn, the policy expertise of the OECD itself.

The global expansion of PISA raises several questions about the influence of ILSAs on global policy and practice in education (**Addey and Sellar, 2018**). Often, participation in PISA by developing countries is driven by the motive to be put on the global education map, a decision primarily driven by political reasoning (**Grek, 2009; Kamens, 2014; Wiseman and Chase-Mayoral, 2014; Addey, 2015**), but also for reasons of accountability, transparency and social development leading to ‘governance by comparison’ (**Novoa and Yariv-Mashal, 2003; Grek, 2009; Addey and Sellar, 2018**). Addey and Sellar (2018) summarize, through data analyses, the seven factors that drive participation in larger-scale assessments by nations: (1) evidence for policy;

(2) technical capacity building; (3) funding and aid; (4) international relations; (5) national politics; (6) economic rationales; and (7) curriculum and pedagogy. These demonstrate the complex dynamics between ILSAs and epistemological and infrastructural global governance. The World Bank, along with associated grant agencies and governing bodies, is a major advocate of large-scale assessments in developing countries, often projecting assessment scores as evidence-based achievement markers for what works (or not) in education. However, interpretations of PISA results are ambiguous, and variables at national levels lead to what are known as ‘multiple truths’. Furthermore, there are several other concerns regarding the use and abuse of such global summative assessments (**Lockheed, 2013**). These concerns include the ‘floor effect’ of PISA, where the assessment might prove to be overly difficult for some nations due to irregularities in measurement at the lower end of the continuum. There are suggestions that the OECD’s



Longer-Term Strategy of PISA (OECD, 2015) with adaptive testing might provide a better assessment model (Rutkowski, Rutkowski and Liaw, 2019).

In the current context where governments are induced to engage in constant reform in pursuit of global educational targets, a more cautious approach to the understanding of the OECD and its post-2015

education agenda is suggested (Li and Auld, 2020). Interpretation of PISA data is carried out by three primary actors: the OECD, governments and media. Grey and Morris (2018, p. 109) note the role the media plays in creating and publicizing narratives derived from the PISA results, calling it ‘mediatized global governance’. PISA is currently considered to be a good proxy measure for the educational quality of a nation, often driving the education policy

PISA data and education policy and reforms within nations are simultaneously accompanied by the emergence of a connected network of economy, commerce and educators.

decision-making with an aim of maximizing economic success. The growing advocacy between PISA data and education policy and reforms within nations is simultaneously accompanied by the emergence of a connected network of economy, commerce and educators, who use PISA data as evidence for ‘best practices’ and gather support to finance their education based on commercial ventures (**Auld and Morris, 2014, 2016**). The emergence of the OECD as a form of neoliberal educational governance used by policy-makers across nations to selectively drive their agendas within educational reforms is well documented and critiqued (**Woodward, 2004; Mahon and McBride, 2009; Ball, 2012; Sellar and Lingard, 2013, 2014; Sjøberg, 2016; You and Morris, 2016; Yasukawa, Hamilton and Evans, 2017**).

The authority of an international organization such as the OECD has both ‘rational-legal and moral dimensions’, which is consistent with the observation that an ‘international organization’s political authority is at its zenith when the rational/technical agenda aligns with prevailing

social values and sentiments’ (**Eccleston, 2011, p. 248**). In this aspect, the enhanced significance of PISA can be explained in terms of new demands for international comparative measures of educational performance in an age of accountability and audit culture (**Hopmann, 2008**) and evidence-informed policy-making (**Head, 2008; Wiseman, 2010**). The enhanced significance of data in the OECD’s education policy work has affected modes of educational governance in many societies. Jakobi and Martens (**2010**) argue that the demand for technical expertise has enabled the organization to enlarge its ‘toolbox of governance mechanisms’. The OECD now produces what we see as globalized education policy discourses (**Lingard and Rawolle, 2011**), through peer reviews of policy, data generation and analysis, and its impact on the framing and stages of policy-making and enactment within nations. The technical expertise of the OECD has contributed to the emergence of a global education policy field and its intergovernmental structure helps to establish this network of policy



actors across national capitals (Lingard and Rawolle, 2011).

In 2013, the Central Committee of the Communist Party of China announced a series of educational reforms designed to change the disadvantages of a system where

'one's fate is determined by one examination' (Decision, 2013, p. 12) – an often quoted saying regarding the dominant role of the NCEE in China. According to policy discourse, reform of test-centric education is essential for the development of student's

BOX 2: CHINA

The technical expertise of the OECD has contributed to the emergence of a global education policy field and its intergovernmental structure helps to establish this network of policy actors across national capitals.

individual talent, innovation and creativity, skills necessary for China's modernization and knowledge economy. Although varied across provinces, reforms are national; pilot programmes in Shanghai and Zhejiang, in 2014 were later implemented in Beijing, Tianjin, Shandong and Hainan in 2017. In 2018, the reform expanded to eight provincial-level regions, namely Hebei, Liaoning, Jiangsu, Fujian, Hubei, Hunan, Guangdong and Chongqing. In particular, two reforms have been hailed as milestones in improving both educational quality and furthering 'quality' (sushi) education goals (Zhen, 2017): student choice of

subjects across previous set streams of fine arts or science, and alternative assessments known as comprehensive quality evaluations (*zonghesuzhipingjia*).

According to policy, the ending of subject streams and the promotion of student choice across six subjects of physics, chemistry, biology, geography, history and politics will cultivate diversified talent by creating more 'personalized' education reflective of individual interests and strengths. However, research on student choice has shown an overwhelming preference for science courses among both

students and parents; entrance into Tier 1 universities requires exams in physics or chemistry, and graduating from top universities translates into better job opportunities. There are pedagogical considerations as well, as science majors express a preference for learning outside of rote memorization, a form of pedagogy most associated with fine arts (Frame, 2020). Combined with seventy years of educational policies and higher education funding geared toward science and technology in the service of national development, the promotion of ‘personalized’ learning runs counter to both historical and institutional arrangements, particularly in a decentralized system where funding for schools is essentially tied to test scores and university admittance. Finally, maximization of one’s NCEE scores has also been shown to influence student choice much more than personal interest (Li, 2017; Tan and Ng, 2018; Frame, 2020). At present, the cultivation of student choice within a system monopolized

by success in the NCEE, school ranking and higher education opportunity remains a myth.

The importance of scores also figures large in comprehensive quality evaluations, a new university admissions requirement based on alternative and formative assessment rather than the conventional and summative assessment of the NCEE (Tan and Ng, 2018). Designed to promote development of students’ moral, intellectual and aesthetic qualities, evaluations include assessments in ideology, moral character, physical and mental health, artistic accomplishment and social service (Deepening, Section B:2). Considering the objective, quantifiable nature of the NCEE, where an anonymous score decides future opportunity, the subjective nature of teacher assessment is a serious roadblock. Issues of fairness and the prevalent use of *guanxi* in Chinese society has led to fears of corruption in the university admission procedure, particularly amongst disadvantaged rural residents



(Liu et al., 2012). In this light, fairness has little to do with issues of equity; rather, the ‘fairness’ of the NCEE lies in its ability to control higher education opportunity through transparency. Meanwhile, the promotion of meritocracy in educational discourse since China’s Opening Up (Vickers and Zeng, 2017), has thoroughly embedded the idea of hard work and rote memorization in education, especially among rural populations (Wang and Ross, 2010). However, resistance is also prevalent amongst urban middle-class children, who face increased academic pressure, spurred by a taken-for-granted belief that increased credentials equals an increase in career opportunity (Liu, 2008). This is compounded by ‘sea turtles’ (*haigui*), a euphemism for overseas graduates who return to China and are highly sought after by top companies; stories of exorbitant spending on summer programmes designed to give children an advantage over ‘sea turtles’ abound on websites such as

Sina Gaokao. Combined with growing unemployment for college graduates, a desire by urban parents to ‘guard’ their top position against increasing rural migration, and the NCEE being the only means for the middle class to compete with elite education, it is doubtful that alternative assessments will be embraced by a majority of urban schools either (Mok and Jiang, 2017).

In conclusion, the capacity to reform the pattern whereby ‘one’s fate is determined by one examination’ is interwoven with widely-held structures and beliefs about the purpose of education, social mobility, even epistemology. Policy-makers and researchers would benefit greatly from recognizing the impact of both sociocultural and broader socio-economic changes on reform implementation in China’s NCEE system.

BOX 3: AFRICA

Within the African context, there has been an increase in the number of countries engaging with ILSAs, as evidenced by the participation of Senegal and Zambia in PISA-D. The increased involvement of some African countries in ILSAS is driven by the shift in global focus from educational provision to the improvement and measurement of educational quality (**Braslavsky, 2005**). Besides, there is a growing emphasis on the concept of the development of human capital, as measured by learning assessments, being related to a country's economic growth (**Hanushek and Kimko, 2000**).

At the level of national assessment, a rapid growth is also discernible. Statistics show that, since the Dakar conference in 2000, almost 40 per cent of sub-Saharan Africa countries have conducted at least one national assessment, compared to about 25 per cent before 2000. However, together with central Asia, the region still exhibits the lowest level of system-level assessment (**Dakar Framework for Action, 2000**). It is currently almost impossible to find comprehensive, reliable data on the costs of introducing and running a national assessment in most sub-Saharan African countries. It seems that all too often, no proper budgetary planning is done, and accounting records are incomplete.

National assessments (via the information that is generated) have the potential to identify practices that may be responsible for underperformance. Also critical is how information

obtained is utilized to impact education reform in general, and improve learning outcomes, in particular (**Schielbein and Schielbein, 2003**). For example, the underuse of the available



data is one of the shortcomings of national assessment in many African countries. In a study on an appropriate assessment models for higher education, specifically health sciences and technology, Friedrich-Nel, De Jager and Nel (2005, pp. 881–883) investigated current educational practices characteristic of higher education, concluding that for most of the twentieth century, teaching in higher education was geared to exposing students to masses of facts up to the point where the facts became unmanageable. They concurred with Olivier (1999, p. 69) that written examinations, traditionally associated with content-based education and training, remain the dominant form of assessment used in higher learning institutions in South Africa.

A future perspective suggests it is imperative for African policy-makers to put in place mechanisms for developing multicultural assessment standards (Sedlacek, 1994), and/or redefine learning and assessment practices within the Indigenous worldviews

to equip Indigenous students with relevant employability skills. Hence, indigenization of education and assessment in Africa may effectively facilitate teaching and learning in schools, thereby making education more meaningful and responsive to the needs of Africans in this era of globalized education (Obanya, 2007).

There is no doubt that in terms of resource endowments, both China and Africa possess an abundance of human and material resources. However, in the assessment area, it may be apposite to stress that the indigenous languages and cultural values that are reflective in the educational systems of both could be entrenched in assessment and/or taken into consideration. One of the similarities that underlies educational systems' assessment mechanisms in both China and Africa is not unconnected with advocacy for cultural values in their educational assessments. Regardless, the contrast is reflected in the fact that China is represented as a single strong state in which the Chinese indigenous language is rooted mostly in



Mandarin, whereas there is no such common state or unified language in Africa. Although some scholars have argued for Swahili's adoption as an official language in Africa (**Ngugi, 1986; Amidu, 1995; Karenga, 1997; Tabb, 2006**), the project is yet to be implemented as Africa is multi-ethnic. Therefore, it is essential to note that one of the purposes of language unification is to facilitate communication among the people in the continent and aid the patterns of assessment.

9.5 .5

GLOBAL ASSESSMENT AND SUSTAINABILITY

At the 70th Session of the UN General Assembly in September 2015, member states adopted the 2030 Agenda for Sustainable Development (**UN, 2015**). It aims to engage the nations of the world in



... OECD has sought to appropriate and reinterpret the sustainability agenda by developing metrics for monitoring performance in the domain of ESD and generating related rankings, data and indicators.

collectively promoting sustainable development, decreasing global inequalities and realizing universal quality education. At the heart of the agenda are seventeen SDGs, including SDG 4, which covers education seeking to ‘ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’. SDG 4.7 highlights that by 2030 all learners should have the knowledge and skills needed to promote sustainable development, including through ESD and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture’s contribution to sustainable development.

and UNESCO have struggled to assert their authority in interpreting and measuring SDG 4 (especially SDG 4.7). As a case in point, the OECD has made efforts to lay claim to special expertise in measuring ESD through its discourse of ‘global competencies’, repackaging its human capital narrative while effectively marginalizing UNESCO’s humanist perspective. With its ‘Future of Education and Skills 2030’ programme, and the ‘2030 Learning Compass’, the OECD has sought to appropriate and reinterpret the sustainability agenda by developing metrics for monitoring performance in the domain of ESD and generating related rankings, data and indicators (**OECD, 2016**) (see also **WG2-ch1**).

It should be acknowledged that multilateral organizations such as the OECD, the World Bank



9.6

Conclusion and discussion

This chapter shows that key arguments about the purpose and nature of educational assessment are not new. Tensions between the formative and summative functions of assessment are as old as formal education itself. Formative assessment involves the pedagogical skill of monitoring students' learning in order to

identify learning needs and adjust teaching appropriately. Such ongoing assessment for learning is valued for enhancing teachers' focus on the needs of their own students and for achieving greater equity of student outcomes. Research has indicated that an emphasis on formative assessment tends to be associated with more



... an emphasis on formative assessment tends to be associated with more clarity in the setting of learning objectives, more variation in instructional practices and a higher level of student interactions in the classroom.

clarity in the setting of learning objectives, more variation in instructional practices and a higher level of student interactions in the classroom (**Bennett, 2011**). Regarding assessment itself as a form of learning encourages students to become independent and confident learners. The role of teachers then is to help students cultivate self-assessment skills and a growth mindset by creating environments where they are encouraged to confront challenges, while ensuring resources such as models of good practice and emotional support are readily available (for teachers as well as students). But all this assumes high levels of teacher autonomy and professionalism, which in many societies are lacking, or even consciously obstructed by systems for controlling and monitoring teachers (**WG2-ch10**). In contexts where control over education and teachers is prioritized – whether due to an autocratic political environment, or in the name of neoliberal ‘accountability’ – summative forms of assessment, measuring student achievement according to externally imposed

‘outcomes’ metrics, tend to predominate.

Both summative and formative approaches have their place, since ultimately students’ learning will require formal certification to enable them to move on to the next stage of education or into the workforce. However, there is a clear tension between assessment or evaluation as an inescapable and necessary feature of any learning process or education system, and the dangers of excessive emphasis on outcomes-focused assessment. Echoing Dore’s (**1976**) critique of the excessive reliance on credentials in many modern education systems, there is a growing literature today on the phenomenon of ‘meritocracy’ and its relationship with social, political and cultural contexts (**see WG2-ch1, WG2-ch3**). When educational assessment is analysed in context, we are not just discussing better or worse ways of measuring learning from a technical standpoint, but also who is measuring, why and how the results of those measurements are used. The increasingly intense

An important question then is how current research on assessment may contribute to the development of forms of assessment conducive to human flourishing within sustainable and equitable societies.

focus on educational ‘outcomes’ in many societies over recent years, driven in part by the influence of the OECD, is related to assumptions about how society and the economy should work – in particular, the idea that ‘merit’ defined in terms of measurable educational outcomes should determine life chances, as well as assumptions that education’s purpose primarily involves human capital generation instead of human flourishing and the promotion of truly sustainable and equitable societies.

An important question then is how current research on assessment may contribute to the development of forms of assessment conducive to human flourishing within sustainable and equitable societies. There is a risk of reducing the notion of flourishing to what can be technically measured in large-scale assessment exercises, resulting in narrow and distorted conceptions. A focus on flourishing implies a holistic and humanistic view of education built around a model of assessment for and as

learning. It also implies that some important aspects of education for child flourishing cannot be appropriately assessed given our current technical capabilities and would be better left out of assessments. And in that case, the political and normative issue is not assessing child flourishing, but rather what assessment ‘mix’ is most compatible with an approach to education that balances its instrumental functions with its intrinsic importance to a fulfilling life. Some new developments of educational assessment may be considered helpful, including assessments of higher-order skills (such as problem-solving and collaboration), application of advanced technology and improving teaching through assessment.

Understanding the complex relations between assessment and context requires analysis of public discourse on science and evidence, the influences that shape it and the role of vested interests (see **WG2-ch1**). Amongst the choices relating to assessment are choices regarding what counts



... the extent to which it is possible or desirable to aspire to normative or prescriptive ‘solutions’ to assessment-related problems is open to question.

as ‘evidence’. Here we need to address a number of questions concerning issues of science, evidence and objectivity, which are at the heart of much public debate over assessment and education more generally around the world today. Given the complexity of such issues, the extent to which it is possible or desirable to aspire to normative or prescriptive ‘solutions’ to assessment-related problems is open to question. When we consider the role that assessment can or should play in improving our education systems, we need to remind ourselves of the limits of the capacity of assessment reform to achieve the desired improvements. Calls for the introduction of ever more sophisticated and intrusive forms of summative assessment, or of techniques combining formative and summative functions, are often attributable to the widespread tendency in many societies today to see education as the ‘silver bullet’ for a variety of social problems. The heightened stakes thereby associated with the work of teachers and schools generates intensified pressure

for ‘accountability’, which can ultimately subject teachers to ever more intrusive forms of command and control, diminishing their professional status and cramping their autonomy ([see WG2-ch10](#)).

Assessment in crucial ways both influences, and is influenced by, the political and ideological context. A particularly prominent feature of that context in the early twenty-first century is the conduct of standardized global assessments (e.g. PISA), which have acquired such high stakes for many governments, in turn helping to spur a proliferation of national testing regimes. Apart from its implications for teachers’ autonomy and status, this risks narrowing the curricular focus, as educational officials, teachers, parents and students themselves reorient learning to the maximization of test scores. In such circumstances, improvements in scores can be seen not necessarily as the result of improvements in learning, but rather of improvements in test preparation – in teachers’ and

students' skill in 'gaming' the test. Moreover, as noted in **WG2-ch3**, a vast and rapidly expanding global industry of supplementary private tutoring has emerged in recent decades, overwhelmingly geared to coaching students for high-stakes public examinations.

While this chapter has primarily focused on assessment in context, the expansion and intensification of testing in many societies means that metrics have often become an end in themselves. The use of quantitative metrics to judge, rank and monitor performance across a whole range of public institutions, but especially in schools and colleges, has become embedded in the educational systems of many societies, especially those most profoundly influenced by the tenets of NPM. The resulting 'tyranny of metrics' (**Muller, 2018**), justified in the language of public 'accountability', can be hard to resist: why should anyone object to more transparency? What have they got to hide? But time that teachers or other professionals spend filling in forms or administering externally mandated

tests detracts from time available for the exercise of autonomous professional judgement (applied amongst other things, to devising forms of assessment that teachers themselves may consider useful or appropriate); similarly, participation in ILSAs (e.g. PISA-D) also risks diverting scarce resources available in poor nations from other more important priorities. Indeed, the emphasis on ever more stringent accountability and transparency clearly implies an absence of trust in teachers' skills and professionalism that many have found profoundly demoralizing. This lack of trust in teachers and denial of their agency are starkly at odds with the proclaimed commitment of transnational institutions or national ministries to fostering confidence, autonomy and dignity in learners. We may wonder how teachers can be expected to model or inculcate qualities deemed essential to flourishing, when these are increasingly denied in their own professional lives. These issues are further discussed in **WG2-ch10**.

We may wonder how teachers can be expected to model or inculcate qualities deemed essential to 'flourishing, when these are increasingly denied in their own professional lives.



... instrumentalist discourses of human capital and accountability versus humanistic conceptions of the intrinsic value of education in promoting flourishing.

What, then, are the key assumptions informing global approaches to assessment today? Assumptions concerning the nature of education or learning, its purpose, and the role of assessment need to be explicated. There is the need to define the ideological beliefs, economic interests and political agendas that are driving reforms to assessment regimes around the world. Key considerations here include instrumentalist discourses of human capital and accountability versus humanistic conceptions of the intrinsic value of education in promoting flourishing. Despite the joint articulation of priorities in the 2030 Agenda set by the UN, it is important to note that UNESCO and the OECD propose very different normative frameworks for reaching these goals, especially regarding expected educational outcomes, and how they are to be assessed (see Vaccari and Gardinier, 2019). UNESCO embodies a legacy of humanistic and emancipatory ideals, as witnessed in documents such as the **Delors Report** (International Commission on Education for the

Twenty-first Century, 1996), and the more recent report, **Rethinking education: towards a global common good** education: towards a global common good? (UNESCO, 2015). Their focus is on global justice and equality, with a strong emphasis on values and rights, assessed through periodic monitoring reports that draw on a range of quantitative and qualitative data (see UNESCO, 2020 for latest report). The OECD, on the other hand, follows a more technocratic and economic approach, based on an underlying theory of human capital. In terms of outcomes, the OECD places strong emphasis on measurable indicators framed in terms of 'skills'.

While both UNESCO and the OECD promote the global priorities put forward in the 2030 Agenda, an underlying question is whether their respective worldviews are compatible in ensuring educational outcomes that promote more sustainable futures. Elfert (2017) argues that UNESCO's rights based approach has gradually been displaced by the 'hegemony of the economic



worldview' of the OECD. And there is no doubt that the technical and economic prowess of the OECD has seen it play an increasingly prominent role in promoting metrics for assessing ESD. However, considering the loosely defined nature of sustainability, and increasing political polarization around the world, the humanistic and emancipatory vision of UNESCO is important in bringing a critical perspective to the debate over the role of educational assessment in promoting greater social and environmental justice in a global context where the neoliberal outlook remains widely entrenched.

9.6 .1

KEY MESSAGES

Assessment is a vital component of the learning process, but it should be applied with great caution. Excessive focus on measurement of pupil achievement can lead to a narrowing of curricular focus, intolerable pressure on teachers and learners, and distortion of the learning process. A greater usage of the forms of assessment for and as learning may help address this imbalance.



Whilst technological change facilitates our understanding of assessment, including the potential for expanding and refining assessment techniques to make it more adaptive to individual learning requirements, some important features of education for human flourishing cannot easily, or appropriately, be subjected to quantitative measures.

Moreover, the resulting enhancement of our capacity to test and measure learning in new ways also carries significant risks – political and social, as well as educational. Tools for the sophisticated assessment of individual learning can often also be applied for purposes of surveillance and control.

The global intensification of assessment is signalled by the continuing expansion of large-scale assessments, now extending into more low- and middle-income nations. International organizations, such as the OECD, UNESCO and the World Bank, are the key promoters and

suppliers often with the help of technical partners.

PISA, perhaps the most well-known example of an ILSA, is widely perceived as offering insights into the relationship between a country's educational outcomes and its economic growth prospects. However, this relationship is far more complex and uncertain than is commonly recognized, and PISA's popularity illustrates the dangers of excessive quantitative measurement of learning and an overly instrumentalist vision of 'education-as-human capital generation'. Related risks include a narrowing curricular focus, increasing competitive intensity and the persistence of unsustainable economic behaviour.

We therefore need to pay close attention to who conducts assessment and for what purposes. Assessment should serve a vision of teaching and learning that respects the agency and dignity of teachers and learners; it should not become a tool of

state oppression or an instrument primarily for maximizing efficiency in the generation of ‘human capital’. In assessing many of the most important areas of learning, digital technology is no substitute for the professional judgement of experienced educators.

SYNTHESIS OF THE PERSPECTIVES FROM NEUROSCIENCES AND SOCIAL SCIENCES

Evidence from work in the learning sciences and neurosciences shows that formative assessment and assessment as learning throughout the course of schooling can have positive effects on academic achievement.

However, high-stakes, summative assessment regimes can distort the learning process and cause social and psychological harm. The risks of excessively intense measurement of student achievement are illustrated by the experience of societies (for example across much of Asia and, increasingly, in the

anglophone West) where high-stakes assessment regimes have become especially embedded. These risks include not only extremely intense educational competition (credentialism), but also the reinforcing of social divisions based on the assumption that ‘meritocracy’ may justify inequality.

ILSAs, such as PISA, have contributed to harmonizing the global assessment landscape and the formation of a global education policy field. The enhanced significance of PISA derives legitimacy from what is portrayed as a scientific approach to data gathering. It can also be partially explained in terms of new demands for international comparative measures of educational performance in an age of accountability and audit culture. However, the role of ideology and vested interests in promoting the kind of accountability and audit culture associated with dominant assessment regimes is insufficiently appreciated or understood by policy-makers, media and the general public.



Many extremely valuable forms of learning are hard to measure quantitatively, and the expectation that any worthwhile learning must be subjected to quantitative measurement can lead to neglect of some of the most important curricular areas.

Quantitative assessment is especially difficult in curricular areas associated with cultural, historical, artistic, political, ethical or ‘values’ education – including social and emotional learning (SEL). Some research in EN has supported calls for SEL to be integrated within the larger assessment framework if the educational world is to move towards the goals of sustainable development and human flourishing. But quantitative metrics for SEL remain elusive and attempts to design them problematic. (see **WG2-ch8** for a discussion of other problems with SEL discourse).

Much work in EN has focused on tracking and analysing ‘individual differences’ in learning. Neuroscience-informed formative assessment tools can help to identify differences in students’ learning processes and thus potentially aid efforts to support individual learning needs. However, it does not follow that neuroscientifically-informed assessment alone can promise equitable, individually tailored learning opportunities for all students.

As with other aspects of education, the COVID-19 pandemic and the related shift to online learning has provided insights into modes of assessment, particularly both the potential and the limitations of information technology in supporting and assessing learning. Attempts to substitute algorithms for conventional public examinations have reminded us that algorithms are poor tools for predicting future performance, and only as reliable as the information on which they are based – information that is ultimately selected by fallible human actors.



9.6 .2

KEY RECOMMENDATIONS

For researchers and practitioners, understanding the complex

relationship between assessment and context requires an understanding of how ideological beliefs, economic interests and political agendas drive assessment reforms around the world.

Governments and other stakeholders should be aware that extending the scope of educational assessment for



its own sake is not necessarily a good thing, and that excessively intense or intrusive assessment regimes can have seriously harmful effects – on individual learners, on teachers and on society more broadly.

Governments, in consultation with other stakeholders, are encouraged to specify at the outset the purpose of any proposed assessment reform and the problems or issues it is intended to address.

It is especially important that teachers be centrally involved in decisions over reforming assessment practices. Failure to do so will exacerbate problems of teacher motivation and deprofessionalization.

Educators and policy-makers should, as far as possible, ensure that policy and practice are informed by the findings of relevant research – but in seeking expert advice, it is crucial to consult social scientists (who study education systems in their social, political and cultural context) as well as natural scientists (who may offer insights into the neural or biological

mechanisms related to the learning process).

Decisions over assessment reform need to take careful account of the diversity of our societies and cultures, and beware of the ways in which assessment regimes can unjustly privilege particular cultural traditions while marginalizing or suppressing others.

Educational assessment can be improved via development of instruments and statistical methods in the future. Yet in deciding whether, or how far, to deploy new assessment tools informed by neuroscientific research or supported by new technology, educators and policy-makers should proceed with caution, taking care to balance considerations such as the privacy, autonomy and agency of learners and teachers, the (often unintended) impact that new forms of assessment can have on the focus and content of learning, and cost.

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C H A P T E R

10

The teaching profession in context: issues for policy and practice around the world

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This chapter reviews current debates concerning teachers and the teaching profession from a global perspective. It draws on related research on teachers' professionalism and agency, as well as on the contribution of initial teacher education and in-service professional development to identity, motivation and the quality of teachers' work. The analysis also considers various political contexts and how these affect the enactment of teacher professionalism. Among the major issues identified is the impact of a widely prevalent and narrow emphasis on standards-based teacher accountability on teachers' lives, well-being and work. Also highlighted are the strenuous working conditions faced by teachers in countries as diverse as India, South Africa and England. Critiquing a widespread trend towards 'deprofessionalizing' teaching, the chapter stresses the importance to teachers of collaborative professionalism. Of immediate relevance to the context in which this report was drafted is the discussion of cross-cutting issues arising from the impact of COVID-19 on teachers' work and well-being. Special attention is given to the debates, intensified by the pandemic, surrounding the role of technology in teaching, and questions this raises concerning the resourcing of schools, equitable provision, preparation of teachers and our fundamental assumptions regarding the nature and purpose of teaching as a profession.

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10.1

Introduction

The centrality of teachers in education is as important today as it was in the past, despite much zig-zagging at the policy level about what precisely this means and how education systems should recognize and support

teachers. The much-repeated mantra that ‘teachers matter’ has needed at various historical stages to be restated because in practice teachers’ social recognition and working conditions have remained chronically poor across much of



the world. In 1966, two of the most important international organizations (the International Labour Organization (ILO) and UNESCO) joined forces to issue a detailed statement on teachers that covered professionalism, preparation, responsibilities, autonomy, rights and conditions of work, while indicating that teacher shortages should not justify the dilution of professional standards (**ILO/UNESCO, 2016**).

Those recommendations are as valid today as they were in 1966 but require periodic revisiting, drawing on policy studies and research, which in turn require dissemination, discussion and analysis. This chapter attempts to provide an update that focuses on three main areas: initial teacher education, in-service professional development and working conditions.

This analysis is obviously not comprehensive but is informed by recognition of teachers as professionals and of professionalism as the basis of their work and commitment to student education and learning.

The chapter draws on recently published academic research, supplemented by government policy studies or multilateral reports, and various other sources.

Part of the context for this analysis involves a fragmentation and diminution of teacher professionalism associated with claims concerning the promise of technology. Amounting to a turbocharged form of behaviourism, the salience of this trend varies considerably across national contexts, taking a particularly extreme form in societies (such as India) where powerful interests have long sought to limit or undermine teacher autonomy (**Kumar, 2017**). Some of the enthusiasm regarding the allegedly transformative pedagogical potential of technology is associated with agendas, discussed in the previous chapter on assessment in context (**WG2-ch9**), that seek to subject teaching and learning to ever more intrusive forms of ‘outcomes’- focused monitoring in the name of ‘accountability’.

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Why does this matter?

Throughout the ‘context’ section of this report, we emphasize that assessing the performance of education systems must involve critical reflection on our assumptions concerning what education is for – assumptions that are in turn shaped in complex ways by history, politics and culture. The claim that educational efficiency can be achieved by diminishing the human factor in the pedagogical equation reflects a narrowly instrumental, mechanical vision of learning that not only devalues teachers, but also reduces students to mere receptacles for productivity-enhancing skills and knowledge. But if it is accepted that any education system should be characterized by certain core values and transformative goals, including inclusion, social justice and the promotion of human agency and dignity, then it follows that teachers play a vital role in

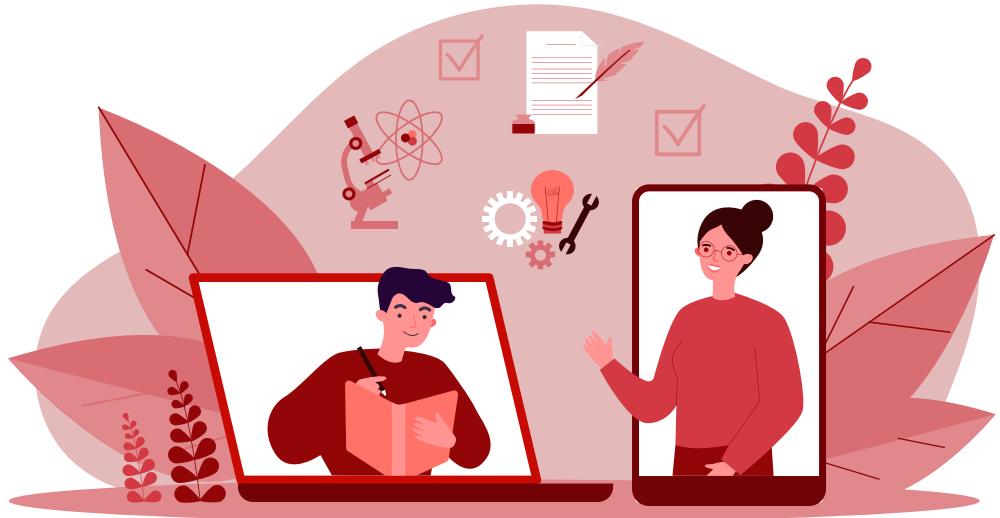
enacting and modelling these values. Valuing autonomy, dignity and agency in our students entails valuing the same qualities in our teachers.

This chapter surveys the educational landscape from the perspective of teachers. The issues that emerge range from teachers’ working conditions, status, training, access to pedagogical resources and challenges presented by student diversity, to questions of teacher agency and involvement in policy-making. The chapter also discusses the significance of technological developments, both for the practice of teaching, and for the conceptualization of teachers’ roles. With consideration of the implications of technology rendered more pressing by COVID-19, the chapter also includes discussion of some specific challenges the pandemic has posed for teachers.



10.2

Teachers' roles and paradigms of teacher preparation



Three terms often used to describe the role of teachers – training, instruction and teaching – convey the historical trajectory of the development of teachers' work and their role in the life of children. The habit of seeing teaching simply in terms of mechanical forms of 'training' came under increasing criticism from the early twentieth century for its implicit denial of autonomy or agency. Dominant visions of the nature and purpose of teaching tended to deny or underplay the importance of teachers' independent judgement and agency. While undeniably an important component of education, training

came to be seen as an inadequate paradigm by many educators, especially those influenced by progressivist thinkers such as John Dewey (1923), Neil Postman (1996) and Paulo Freire (2018; Gerhardt, 1993). Another term frequently used to describe teachers' work – 'instruction' – has also become inadequate for many, and for similar reasons, since the concept of 'instruction' focuses on the transmission of predetermined curricular content. Both teacher and learner recede in importance as content, its ordering and presentation, take centre stage. This distinction is important, since preconceptions concerning the

In more overtly authoritarian societies, such as China, the impetus towards increasingly intrusive control over the teaching profession does not need to be cloaked in the language of choice or neoliberal efficiency.

purpose of teaching embedded in the use of terms such as ‘training’ or ‘instruction’ have long shaped structural arrangements governing teachers’ work and professional lives.

Significant changes to the status of teachers and their working arrangements have been driven in many societies by interests keen to subject teachers to increasingly stringent top-down control, either because they see schools as failing to deliver economically relevant ‘skills’, or as undermining the established political order, or both. From North America to South Asia, a ‘discourse of derision’ directed at the teaching profession has been promoted by a coalition of forces portrayed by Michael Apple (2001, p. 410) as consisting of:

multiple fractions of capital who are committed to neo-liberal marketized solutions to educational problems, neo-conservative intellectuals who want a “return” to higher standards and a “common culture”, authoritarian populist religious conservatives who are

deeply worried about secularity and the preservation of their own traditions, and particular fractions of the professionally and managerially oriented new middle class who are committed to the ideology and techniques of accountability, measurement, and the “new managerialism”.

While Apple writes from a North American perspective, the operation of a similarly constituted coalition is observable in other Anglophone societies, across South Asia (Subramanian, 2019), and to varying extents elsewhere. In more overtly authoritarian societies, such as China, the impetus towards increasingly intrusive control over the teaching profession does not need to be cloaked in the language of choice or neoliberal efficiency (Vickers and Zeng, 2017).

In contrast to notions of ‘training’ or ‘instruction’, the concept of ‘teaching’, taken in the round, encompasses the relationship between teachers and students, their shared interest in the learning process and, most importantly, an imaginative or creative sympathy



joining the minds of teacher and student. Teachers' work should be understood not simply as imparting subject content in accordance with mandated standards (though standards, in some form, have their place), but also engaging with the identities of their students. In more progressive understandings of education, the teacher is transformed from an authoritarian instructor (or Dickensian Gradgrind) into an enabler who understands the importance of emotional respect as a precondition for intellectual learning.

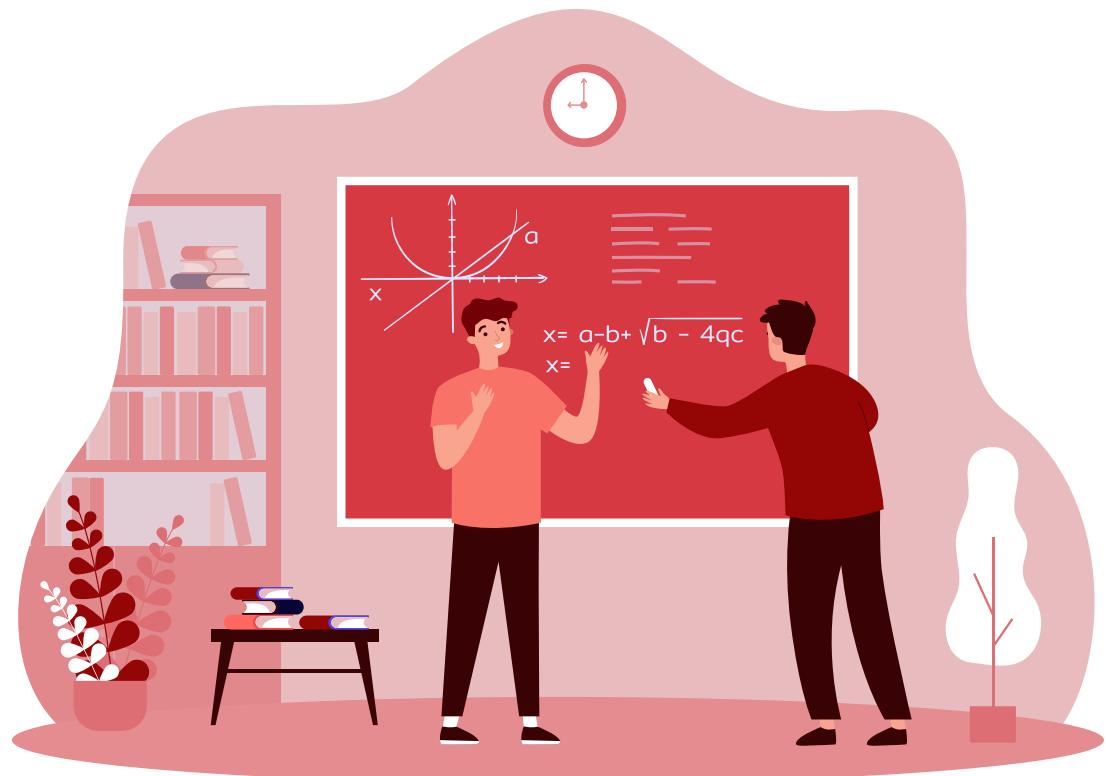
While a recent UNESCO report ([Singh and Duraiappah, 2020](#)) also articulated this essentially humanitarian perspective, it has been systematically enfeebled by pressure to prioritize measurement of 'outcomes' in terms of capital enhancement and productivity growth ([Schleicher, 2020](#)). The exponents of this instrumentalist, human capital orientation have more recently adopted more humanistic rhetoric ([WG2-ch1, ch8](#)), espousing the cause of 'social and emotional learning' ([WG2-ch8](#)) or 'twenty-first century competencies', but their

position remains rooted in the logic of human capital formation. For instance, in the McKinsey Global Institute's 2018 report on the future of work it is suggested that

20 to 40 percent of current teacher hours are spent on activities that could be automated using existing technology. That translates into approximately 13 hours per week that teachers could redirect toward activities that lead to higher student outcomes and higher teacher satisfaction. In short, our research suggests that existing technology can help teachers reallocate 20 to 40 percent of their time to activities that support student learning. (Bryant et al., 2020).

Teachers' work should be understood not simply as imparting subject content in accordance with mandated standards, but also engaging with the identities of their students.

Technology has a potentially valuable role to play in the learning process ([WG2-ch6](#)), but there is a danger that such discourse propagates the notion of teachers as cogs in a pedagogical machine geared to delivering high test scores, rather than professionals who should be capable of engaging their own judgement in decisions over what should be taught, when and how.



10.3

Teacher education and professional development

A considerable international literature underlines the importance for teachers of well-developed pre-service teacher education programmes combined with career-long opportunities for professional development (Darling-Hammond, 1999; Day et al.,

2007). However, a constant refrain of much of this commentary concerns the perceived inadequacies of teacher education in many societies, particularly but by no means only in the Global South.



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10.3 .1

ESSENCE AND PLACE

The evolutionary path of teacher education between the early-nineteenth and mid-twentieth centuries, from lowly normal schools to a more elevated status in teachers' colleges and universities, has meant that although 15 per cent of education systems continue to prepare teachers at secondary level, most countries now do so at universities and other tertiary institutions (Labaree, 2008; Ávalos and Razquin, 2017; Ávalos and Reyes, 2020). The basis for this progress has been increased understanding that teaching is a profession requiring solid knowledge and a practical base together with motivation and commitment.

Historically, many teacher education programs have fallen into one of two categories: undergraduate-level programs, combining subject-focused

instruction with courses in pedagogical knowledge and practical teaching experience; or programs constituting a distinct stage of post-graduate professional preparation. More recently, however, two contrasting forms of teacher preparation have emerged. The first, considering teacher education as a matter for higher education institutions, is reflected, for example, in the decision adopted by countries associated with Europe's Bologna Process to upgrade teacher preparation to a two-year Master's-level programme involving professional study and practice. The second form, epitomized by England, reduces the role of university preparation by promoting school-based alternative paths into teaching. To acquire 'qualified teacher status' under the latter arrangements, university graduates may engage in teacher preparation at universities, in programmes managed by school consortia or through school-based salaried routes into teaching. This approach to teacher preparation has been criticized for relying on a diminished, technically oriented notion of what is required to

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become a teacher. It fails to acknowledge that learning to teach is a complex process involving research-based curricular, and philosophical, psychological and sociological learning that is well integrated with pedagogy and practical learning (Furlong, 2013; Zeichner, 2014; McIntyre, Youens and Stevenson, 2019).

10.3 .1

MOTIVATION, IDENTITY DEVELOPMENT AND PROFESSIONALISM

Debates and research associated with teacher education continue to examine traditional themes such as motivation for teaching, identity development and links between subject knowledge, pedagogy and practice in different teacher education formats. Newer areas of research attention encompass inclusion, as a challenge confronting prospective teachers, and the associated task of mastering content and pedagogical approaches needed to educate diverse student populations.

There is also a growing emphasis on the pedagogical use of digital technologies that has been intensified by the COVID-19 pandemic (OECD, 2021; see the section below on the impact of COVID-19).

Motivation to become a teacher, as an indicator of commitment to remain in teaching, has been a longstanding subject of research, examined through different lenses. Two studies, based on very different populations, offer insights into motives for teaching. The first, by Bruinsma and Jansen (2010), explores motivation from the perspective of extrinsic and intrinsic factors and of reasons labelled as ‘adaptive’ or ‘maladaptive’ depending on their relevance to teaching as a profession. Results show an association, mainly among female candidates, between ‘intrinsic adaptive’ motives and positive self-efficacy perceptions together with positive views about their preparation program quality. Having ‘intrinsic adaptive’ motives is also related to future teacher intentions to remain



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in the profession, which were weaker among those exhibiting a ‘maladaptive extrinsic’ motivation for teaching. The second, and very different, study – in terms of the population surveyed – examines ‘calling’ to the profession (Madero, 2021). In semi-structured interviews, teachers were asked to reflect on how they had discovered, lived and defined their decisions to teach. The study confirms the role of initial intrinsic motivation factors in decisions to remain in teaching. Taken together, the studies of Bruinsma and Jansen (2010) and Madero (2021) provide evidence about the diversity of concepts through which teacher motivation may be captured, as well as how teachers engage with their teacher education programmes and express their commitment to remain in the profession.

Motives for entering teaching contribute to initial professional identity perceptions, which then develop, strengthen and become particularized in the course of teacher preparation. Beltman et al. (2015) use drawings to elucidate

how future teachers express professional identity during their first year of preparation. These drawings, which feature teachers, students, pedagogical tools and combinations thereof, present forms of idealized teacher identity. These conceptualizations changed as new teachers gained experience of work in classrooms and schools, dealing with a diversity of students, and facing difficulties in their interaction with colleagues. Beltman et al. (2015) conclude by emphasizing the need for teacher educators to assist new teachers to interpret the challenges of teaching as these are encountered, guiding a process of identity formation that sustains their early enthusiasm for the profession.

Closely related to identity is the concept of professionalism, also an important goal of teacher education. The way in which new teachers understand and express their professionalism depends on how their teacher education program, through its taught curriculum and practical elements, situates the role of teachers in relation to the education system

These findings reinforce the importance of pedagogy as a field of enquiry as well as of action.

and its requirements. Based on this assumption, Dodillet, Lundin and Krüger (2019) conducted a comparatively small-scale survey to examine how future teachers in Swedish and German preparation programmes conceptualized professionalism. These groups of future teachers differed markedly in their views of who could be viewed as ‘professional’. Swedish participants described professionals as persons who have ‘faith in science, technology and standardisation’ and responsibly comply with requirements established in official policy documents (Dodillet, Lundin and Krüger, 2019, p. 211). German student teachers, on the other hand, viewed professionalism as a matter of personality and judgement, were less inclined to cite the importance of adhering to policy documents, and stressed the need for reflection in dealing with the education system’s complexities.

While the authors of the above study do not draw conclusions about reasons for the transnational differences in how future teachers

describe professionalism, another study on Swedish teacher education provides a possible explanation (Beach, 2019). The study analyses what it defines as an uncomfortable relation over time between Swedish teacher education and the social justice principles of the comprehensive school system established in 1946, and its neglect in consolidating a unified teacher education structure around a general professional component. Future Swedish teachers’ views of professionalism in Dodillet, Lundin and Krüger’s (2019) study might thus have been affected by insufficient preparation in the social inclusion orientations of the comprehensive school system as opposed to emphasis on subject mastery in a growing context of market policies affecting teacher education (Beach, 2019). Swedish teachers’ views of professionalism might also reflect tensions in the teacher education curriculum between extension and minimalism, between theoretical and practical pedagogy, and between primary and secondary teacher preparation (Beach, 2019).



In the case of Israel, Smith and Lev-Ari (2005) compare subject-focused and general education courses, finding that almost all students rated experience gained through their teaching practicum as highly important. But almost equally important for their interpretation and handling of practical classroom situations was the theoretical base provided by courses in pedagogy and didactics, including knowledge about students with special needs.

These student teachers did not judge the quality of their teaching preparation curriculum through the prism of a crude theory-practice dichotomy. Rather, they valued the relevance of theory to their perceived work demands as student teachers or not yet fully practicing ones (Smith and Lev-Ari, 2005). These findings reinforce the importance of pedagogy as a field of enquiry as well as of action (Alexander, 2008).

BOX 1: COLONIAL LEGACIES, THE POLITICS OF CONTROL AND TEACHER DEPROFESSIONALIZATION: THE CASE OF INDIA

In India, as in much of the Global South, the status of teachers and arrangements for their pre-service training bear the mark of the legacies of colonial rule. These include historically low levels of overall investment in schooling, low status for teachers and – related to this – the prioritization by government of control over teachers' professional autonomy. These factors have contributed to the prevalence of a diminished, subordinated, deprofessionalized vision of the teaching profession.

Ancient and medieval Indian societies regarded teaching as a specialized and relatively high-status activity (**Shahidullah, 1987**), but it was only in the mid-nineteenth century that systematic programs of teacher training introduced by the colonial government introduced notions of a teaching 'profession' (**Kumar,**

2014). Then, teacher training took the form of highly didactic programs following uniform guidelines handed down by the colonial government; there was little pretence in valuing or promoting professional autonomy. Today, in the early twenty-first century, official Indian government documents continue to reflect the enduring legacy of this model. The National Curriculum Framework of 2005 states that 'the basic features of these programs as well as the theoretical premises have not altered significantly. Although newer concerns, surfacing from time to time, have been taken cognisance of, these have not influenced in any major way the mainstream teacher education' (**Gol, 2006, p. 3**). Successive official commissions established by colonial and post-independence governments with the declared aim of improving the quality of teachers' professional



The dominant vision of the teacher is that of a community developer and low-level government functionary rather than an autonomous professional tasked with educating young children and adolescents.

preparation have done little to alter the fundamentally colonial character of Pearson Test of English (PTE) programmes. As Kumar (2008) observes, ‘a whole century has gone by without the instrumental character of teacher training being challenged or reformed’ (p. 38).

The approach to professional teacher education in India is shot through with assumptions of hierarchy. Secondary school teachers are trained in universities, whereas elementary and kindergarten teachers are trained in diploma-granting institutions with non-university status. A secondary school teacher is required to have a bachelor’s degree in arts or sciences as well as a professional qualification, namely a Bachelor of Education. An elementary school teacher requires a senior secondary school graduation certificate and a professional qualification, namely the Diploma in Elementary Education.¹

The dominant vision of the teacher is that of a community developer and low-level government functionary rather than an autonomous professional tasked with educating young children and adolescents. As a result, there is generally little attempt to implement training programmes that articulate ‘theoretical reflection’ with effective educational practice (Batra, 2009). Teachers are seen merely as agents for the delivery of the textual material supplied in officially prescribed textbooks. Struggles witnessed in countries such as the United Kingdom (UK) or the United States (USA) over the best way for university teacher-training programs to balance the concept of method with different forms of knowledge, namely liberal, propositional and moral (Kumaravadivelu, 2001; Furlong, 2013), have been largely absent in the Indian context. Kumar (2017, p. 1) argues that

¹With the exception of an integrated program offered by Delhi University, professional education for elementary teachers remains outside the purview of universities.

A teacher is expected to be obedient and industrious rather than professionally independent and capable of making informed choices on their own authority.

'the growth of educational studies in India as a whole has been sluggish and the overall body of knowledge generated so far is neither balanced nor adequately contemporary'. Raina and Raina (1971) conducted a study to assess the characteristics teacher-educators encourage in their trainees. The top six were: industriousness, consideration of others, receptiveness to others, obedience, courteousness and timely completion of tasks. They assigned little importance to curiosity, independent thinking and critical scrutiny of evidence (p. 305).

This outlook, which reflects radical deprofessionalization verging on infantilization of teachers, remains dominant today. A teacher is expected to be obedient and industrious rather than professionally independent and capable of making informed choices on their own authority. Teacher training programmes in India produce teachers who are conditioned to adjust themselves to the prevailing system with

minimal fuss, while paying lip-service to goals such as enabling teachers to contribute constructively to efforts at school reform (Gupta, 2017). Restrictions on public investment since the 1990s combined with a push to expand educational access have further exacerbated such problems, producing even weaker (and cheaper) alternative forms of teacher education based on marketized or privatized models. Large-scale appointments of ill-trained or quasi-trained teachers to positions in the publicly funded schooling system have proceeded in the context of a prevalent attitude of cynical resignation regarding the quality of teacher education programmes. The result has been a further dilution of the professional identity of the teacher, and considerable erosion of faith in teacher agency (NCERT, 2007). Such a teacher, trained to think and act as an automaton, easily becomes a 'meek dictator' who abides strictly by convention, immerses themself in clerical work and submits unquestioningly to the diktat



.. the term ‘professional’ became increasingly applied to a holistic conception of teacher–student interaction, encompassing identity building, social and personal integration, competency development, personal and communitarian responsibility as well as ethical and political

of their bureaucratic overlords (*Kumar, 2014*). The conception of the Indian school teacher’s role, as reflected in and reinforced through arrangements for teacher training, thus manifests fundamental continuity with

the colonial era, even though the market now functions alongside bureaucratic oversight as an auxiliary mechanism of control.

10.3 .2

BREADTH OF PROFESSIONAL DEVELOPMENT ACTIVITIES

While teacher professional development continues to involve formal and less formal activities designed to improve teachers’ knowledge and practice, especially in countries with lower education achievement levels, increasingly it takes on more sophisticated meanings and forms. Gorzoni and Davis (*2017*) refer to changes after 2006 in how ‘professional

development’ is studied in the research literature. The term ‘professional’ became increasingly applied to a holistic conception of teacher–student interaction, encompassing identity building, social and personal integration, competency development, personal and communitarian responsibility as well as ethical and political commitment. In different locations around the world, these conceptual changes also emerged from a review of published studies on teacher professional development conducted between 2000 and 2010 (*Ávalos, 2011*). These studies brought out the importance of professional learning and reflection as mediated by teacher co-learning and its impact on cognition, beliefs and practices.

Teacher professional development occurs in situations that are intertwined with and marked by political debates, school contexts, curricular change and collaboration with teaching colleagues.

The trend towards a broader conceptualization of teacher professional development is highlighted in Sancar, Atal and Deryakulu's (2021) review of related literature, informing their distinction between 'traditional' perspectives and 'newer' approaches. Traditional approaches, often described as 'in-service training' (Ávalos, 2011), comprise courses or activities designed to improve teaching practice, where the role of the 'trainee' is typically conceived in rather passive terms (see the discussion above of teacher preparation paradigms). Newer approaches accentuate teacher personal learning in situated contexts which involve collaborative, inquiring and self-directed actions. Seeking to capture its essence, the authors (Sancar, Atal and Deryakulu, 2021) describe teacher professional development as a dynamic, ongoing activity in which teachers' personal characteristics interact with what they teach, how they teach and with student learning. Teacher professional development occurs in situations

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10.3 .2 .1

COLLABORATIVE PROFESSIONALISM

Moving beyond managerialist notions of occupational professionalism, Whitty (2008) emphasizes the status of teachers' collaborative professionalism as central to their work. This collaborative professionalism might be guided by broader concerns for social equity or inclusivity as well as by the pursuit of effective learning. Collaboration, Whitty contends, should be democratic, and include teaching assistants, parents and others in the community, as well as the voices of pupils, especially those from marginalized backgrounds.

Hargreaves and O'Connor (2017, 2018) further distinguish between



... communities of practice stimulate mutual learning through relevant activities, including production of teaching materials directed to the analysis and improvement of teaching.

'professional collaboration' and 'collaborative professionalism'. The concept of professional collaboration, typically found in more managerialist literature, tends to denote a relatively narrow focus on the collaborative pursuit of measurable 'outcomes'. Collaborative professionalism, on the other hand, typically refers to broader practices of engagement in school communities through sharing of teaching activities oriented to student learning. It involves dialogue, constructive feedback and continuous collaborative inquiry (**Hargreaves and O'Connor, 2017**). Hargreaves and O'Connor (2017) provide specific examples of the building of school-based collaborative professionalism, such as enactment of the well-known Japanese practice of Lesson Study in Hong Kong and teacher collaboration in innovative pedagogy through the Escuela Nueva program, a large rural school network in Colombia (**Hargreaves and O'Connor, 2017**).

Teacher collaboration may involve participation in what are broadly known as 'communities

of practice' (**Lave and Wenger, 1991**) and their diverse forms (**Ávalos, 2011**). Beyond just 'sharing', communities of practice stimulate mutual learning through relevant activities, including production of teaching materials directed to the analysis and improvement of teaching (**Spillane, Alverson and Diamond, 2001**).

Teacher professional learning networks also illustrate forms of teacher collaboration guided by diverse educational purposes. Like other professional development activities, networks benefit from research that analyses their positive impact as well as their limitations. Pérsico et al. (2020) studied two teacher networks in Italy and Spain in the field of technology enhanced learning, otherwise known as self-regulated learning. They surveyed 238 teachers regarding their beliefs and self-reported sharing behaviours. Teachers were questioned about four possible actions in which they might have engaged individually when designing learning activities: consuming or using existing knowledge and resources; creating

... a clear positive effect of network activities on individual teachers' sense of professional identity and commitment to teaching, as well a growth in professional efficacy and increased collaboration with colleagues.

or generating new knowledge; connecting with others to share information sources; and contributing created knowledge to network members. Results showed that while teachers professed a belief in the importance of all the 'Cs', they were less open to 'connecting' and 'contributing'. They seemed to resist disclosing their personal 'learning designs' as well as reusing those of others. While such resistance might be related to teachers not yet feeling comfortable with the quality of their designs or plans, Pérsico et al. (2020) suggest that it might reflect insufficient development of participatory cultures within schools, as well as motivational and emotional barriers that hinder 'altruistic behaviours' among teachers.

The second study by Anderson et al. (2019) analyses teacher professional learning networks operating in Mombasa, Kenya since 2010, with support from the Aga Khan Foundation. The study examines these networks' overall functioning, teacher interactions and learning, and their impact on teaching and school

improvement. Throughout two years of fieldwork, the researchers studied documents, conducted focus group interviews, observed meetings and classroom teaching, and conducted 83 individual interviews with network participants, leaders, trainers and education officials. They observed a clear positive effect of network activities on individual teachers' sense of professional identity and commitment to teaching, as well growth in professional efficacy and increased collaboration with colleagues. Teachers also implemented some changes to their teaching practices informed by their peers' feedback, although their capacity for dealing with any challenges or difficulties arising from these changes was found to be somewhat lacking. Follow-up support and an element of peer accountability seemed to help teachers transfer and fully adopt new teaching methods in their classrooms, although some evidence emerged of differences between younger and older teachers. Despite these positive effects, impact on school improvement



appeared weak, possibly due to insufficient reflective interaction by teachers with their school communities, and to a lack of integration with the overall structures and organization of the education system (**Anderson et al., 2019**). In other words, failure to institutionalize, support and sustain a culture of collaborative professionalism among teachers meant that any benefits from such pilot programmes were liable to prove fragile or short-lived.

The long-term effects of professional development are difficult to capture in single studies. Seeking to overcome this difficulty, Hernández-Hernández and Sancho-Gil (2019) worked intensively over several months with teachers in a school in Spain who engaged in the drawing of ‘cartographies’. These are visual expressions or maps of each participant’s learning trajectory, comprising physical, emotional and intellectual elements. By sharing and talking through these visual expressions as a group, the participant teachers were able to single out the

sites, moments and content of their learning trajectories. The process involved the personal ways in which teachers expressed the contribution to their professional practice, experiences of professional development, workplace learning as well as reflections on self-learning. The authors conclude that professional learning is a continuous process, not associated with single formative experiences, but a mesh of many influences that leave a mark in each teacher’s biography (**Hernández-Hernández and Sancho-Gil, 2019**).



10.4

Professional agency, working conditions, attrition and shortage

Building a culture of collaborative professionalism requires that teachers possess significant agency and autonomy. But whether in a system such as India's, where legacies of colonialism meet neoliberal managerialism, or in authoritarian China, or in Anglophone 'liberal democracies' such as the USA and the UK, teacher autonomy and agency

have eroded in recent decades. The 2013–14 *Education for All Global Monitoring Report* (UNESCO, 2014) argues that investing wisely in teachers, along with other reforms aimed at strengthening equitable learning, could transform the long-term prospects of people and societies. Meanwhile, ideas borne out of progressive educational movements, such as



The 2013–14 Education for All Global Monitoring Report argues that investing wisely in teachers, along with other reforms aimed at strengthening equitable learning, could transform the long-term prospects of people and societies.

‘activity-based’, ‘learner-centred’ or ‘culturally sensitive’ pedagogy have tended to become hollowed-out slogans, while governments pursue policies designed to render teachers more narrowly accountable and less capable of realizing such ideals in practice.

Learner-centred pedagogy has been criticized as flying in the face of the reality of both teachers and students in certain societies, due to a combination of cultural and structural factors (Chisholm and Leyendecker, 2008; Verspoor, 2008; Schweisfurth, 2011). It has often been implemented in a top-down manner evincing little sensitivity for the beliefs of practicing teachers, or the practical challenges they face (UNESCO, 2004; Ampadu, 2012; Ovute, Alamina and Kulu-Uche, 2015). Crucial aspects of the socio-political context ignored by such initiatives (often voiced by academics and donors) include endemic tardiness and absenteeism on the part of teachers (Verspoor, 2008); incomprehension of, or resistance to, new ideas such as inquiry-based teaching and learning (Rogan and Aldous, 2005; Chisholm and Leyendecker, 2008;

Nsengimana, Habimana and Mutarutinya, 2017); inadequate resourcing, and limited teacher capacity and experience (Schweisfurth, 2011); and stark contradictions between the new ideas and the rigidly didactic ethos of pre-service and in-service teacher preparation programmes (Audet and Jordan, 2003).

In many societies, teaching is increasingly seen as a stressful occupation, due to administrative burdens, long hours, classroom management difficulties and lack of autonomy. Maphalala (2014) investigated the sources of occupational stress amongst primary school teachers in KwaZulu-Natal Province, South Africa. The study found that major causes of teacher stress included constant curriculum changes, workload pressures, job insecurity, poor relationships with colleagues, poor rewards and recognition, discipline problems among students, poor rapport with management and role ambiguity. The areas that teachers viewed as most stressful were policy changes, workload pressures and classroom discipline.

... teachers on average experience greater stress than other professionals.

Similar results emerged from a 2019 study conducted by the National Foundation for Educational Research in England (**Worth and Brander, 2019**). The study found that teachers on average experience greater stress than other professionals. With a constant rise in the number of students and an increasing proportion of teachers leaving the profession, the report found that one in five (roughly 20 per cent) felt stressed about their job most or all the time, compared with 13 per cent of those in similar professional occupations. Two out of five teachers (41 per cent) were dissatisfied with their amount of leisure time, compared to 32 per cent of similar professionals. ‘Teaching’s traditional “recession-proof” advantage over other professions has eroded over time due to a relatively strong graduate labour market’ (**Worth and Brander, 2019, p. 5**). Higher job security for graduates outside of teaching makes it harder to attract them into teaching and retain them.

Earlier this century, Halperin and Ratterree (**2003, p. 133**)

drew attention to ‘the swiftly accelerating shortage of teachers worldwide who are qualified and available to teach present and future generations of children’, calling it a ‘silent crisis’. The authors based their claim on the findings of a 2002 survey conducted by the International Labour Organization (ILO) and UNESCO, which showed that teacher attrition was making a chronic situation worse in many developing countries. Halperin and Ratterree (**2003**) identify four reasons for the crisis of missing teachers in both rich and poor countries: (1) the persistence of popular myths that just about anyone can teach, promoting casual or dismissive public perceptions of teachers’ work; (2) the teaching profession’s growing loss of prestige in many societies due to failure to compete with more highly salaried occupations requiring similar qualifications; (3) teachers’ increasing struggles in dealing adequately not only with conventional pedagogical tasks, but also with increasingly complex social problems faced by students, their parents and carers,



Two out of five teachers (41 per cent) were dissatisfied with their amount of leisure time, compared to 32 per cent of similar professionals.

and the local community; and (4) ingrained habits and beliefs concerning the ‘right’ way to teach that teachers have found difficult to revise or adapt. In relation to this last point, Halperin and Ratteree (2003) found that when confronted with learners and classrooms operating in a rapidly changing social, economic and technological context, teachers often feel helpless and exhausted – a problem frequently compounded by the absence of appropriate in-service training, or a collegial culture of collaborative professionalism.

More recently, UNESCO (2016) reported that out of the 24.4 million teachers needed to deliver universal primary education, 21 million were required simply to replace teachers who had left the workforce. The remaining 3.4 million were needed to expand access and provide quality education. The need for additional teachers was found to be even greater at the secondary level, with a total of 44.4 million needed by 2030, 27.6 million of whom were to replace those who had left the

profession. Together, sub-Saharan Africa and South Asia accounted for over 76 per cent (14.6 million) of the new teachers needed in developing countries to achieve universal primary and secondary education by 2030. The remaining 24 per cent (4.6 million) were shared across other developing regions, with South-East Asia and Western Asia accounting for one million each. The most pronounced shortages were in sub-Saharan Africa, where a total of about 17 million teachers are required in order to achieve universal primary and secondary education by 2030 (UNESCO, 2016).

The assumption that ‘anyone can teach’ tends to reinforce perceptions of teaching as a low-status profession. It is also reflected in various schemes aimed at drafting ‘elite’ graduates and others into teaching, bypassing the standard training and qualification route. ‘Teach for America’, ‘Teach First’ (UK) and various spin-off programmes such as ‘Teach for India’ (TFI) have opened up a route into teaching for fresh graduates (without teaching

This embodies a profound contradiction: on the one hand, policy discourse demands ever greater rigour from teacher education programmes; but the Teach First model inducts untrained graduates into the classroom after a brief crash course.

qualifications) and mature adults transferring from other career backgrounds. This embodies a profound contradiction: on the one hand, policy discourse demands ever greater rigour from teacher education programmes; but the Teach First model inducts untrained graduates into the classroom after a brief crash course. Talukdar and Sharma (2015) describe how the six-week training module offered to TFI teachers reduces teaching to a technical skill. Packaged as corporate-sponsored philanthropy aimed at reducing educational disparities, the Teach First phenomenon thus exacerbates the deprofessionalization of teachers, further eroding morale amongst regular teachers.

10.4 .1

TEACHER WORKING CONDITIONS

Teachers' professional status and agency thus have a significant

bearing on recruitment, morale and retention rates, but more mundane considerations of remuneration and job security are also important. A foundational definition of appropriate working conditions for teachers is contained in the 1966 ILO/UNESCO recommendations concerning the status of teachers (ILO/UNESCO, 2016). These refer to aspects such as salaries, incentives and working hours, class sizes and contractual situations. Compliance with these conditions is monitored every three years by an international ILO/UNESCO-appointed group, which also evaluates opportunities for and quality of initial teacher education and professional development around the world. In turn, Education International (EI), an organization representing teachers' unions around the world, also conducts periodic worldwide surveys on teachers and their working conditions. Two such surveys took place in 2012 and 2015, with responses from Africa, Asia-Pacific, Europe, Latin America and North America/Caribbean (Symeonidis



and Stromquist, 2020). A third, more recent survey refers to the impact of COVID-19 on teachers and their work (Thompson, 2021). Other information on teachers' working conditions is gathered for its member countries by the OECD in the yearly *Education at a Glance* reports and the TALIS teacher surveys, the most recent of which was conducted in 2018 (OECD, 2019).

10.4 .1 .1

TEACHERS' CONTRACTUAL CONDITIONS AND WORKLOAD

The global EI surveys of teaching union leaders in 2012 and 2015 (Symeonidis and Stromquist, 2020) highlight several problematic issues. Although salaries, according to around half of respondents, were better in 2015 than in 2012, responses pointed to a decline in overall working conditions. Specific reference was made to lack of regularity in the payment of salaries in some African countries, varying by type of school, qualification and gender.

For example, in Punjab, Pakistan, there is a high salary gap between teachers employed in different types of schools (public and public/partnership schools) and between contract and permanent teachers, with higher salaries paid to those on non-permanent contracts (the reverse of the situation in many other contexts) (Ansari, 2020).

In OECD countries (OECD, 2020), between 2005 and 2018, the average salaries of teachers with fifteen years of experience fell by around 2 per cent at primary level and 7 per cent at secondary level. Student–teacher ratios varied by type of institution, and were somewhat higher in private institutions (lower and upper secondary) as well as in secondary vocational programmes (OECD, 2020). Class sizes exceeded the OECD mean of 21 students in Chile with an average of 30, followed by Israel, Japan and the UK (OECD, 2020).

An important indicator of teacher well-being is workload, which is formally expressed as annual

...the Teach First phenomenon thus exacerbates the deprofessionalization of teachers, further eroding morale amongst regular teachers.

number of teaching hours. For OECD countries, the average is 993 hours per year at pre-primary, 778 at primary, 712 at lower secondary and 680 at upper secondary levels (**OECD, 2020**). Countries that exceed these averages are Costa Rica, Chile and Lithuania (**OECD, 2020**). In England, as examined by Allen, Jerrim and Sims (**2020**), over the last twenty years teachers have experienced an excessive workload with up to 60 hours per week of work, in addition to having to work extra hours at home. Working conditions also possibly affect large teacher attrition numbers in Africa (71 per cent) and Latin America (57 per cent).

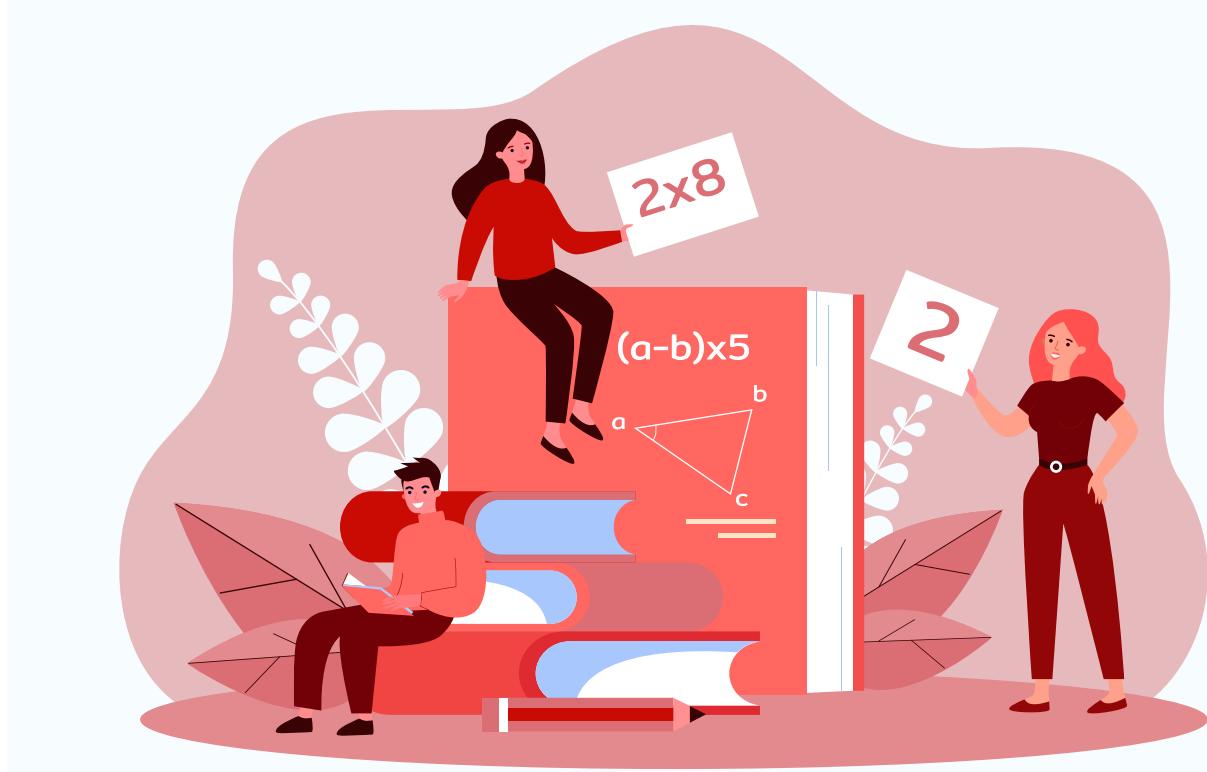
10.4 .1 .2

PROFESSIONAL STATUS, MARKETS AND ACCOUNTABILITY POLICIES

Recognition and support for teacher status and professionalism have been affected over time. More than two thirds of teachers who responded to the EI surveys (**Symeonidis and Stromquist, 2020**)

considered that teaching was not an attractive profession for young people, a situation that possibly impacts on reported teacher shortages in Africa, Europe, Latin America and the USA (**García and Weiss, 2019**).

Although market-oriented policies in educational systems take on different forms (**WG2-ch3**), they generally involve quality assurance or ‘accountability’ measures combined with competitive incentives. These policies affect the management style of schools as well as perceptions and enactment of teacher professionalism (**Mathis and Welner, 2015**). Charter schools, representing a form of semi-privatization (private management with public funding), tend to be associated with the introduction of an ethos of competitiveness, with implications for teachers’ professional status and working conditions. While charter schools or their equivalent (e.g. ‘academies’ in the UK) have mainly grown in industrialized countries (such as the USA and Europe) they form a substantial component of the Chilean schooling system (**Ávalos**



and Bellei, 2019) and of others across Latin America. A study of charter schools in Bogotá, Colombia (Edwards Jr and Hall, 2018) found that compared to public schools, the managerial flexibility of these schools facilitated the use of questionable employment practices: hiring of non-unionized teachers, short-term contracts and lower salaries, despite comparatively lengthy working hours and heavy teaching loads.

In many countries, evaluating teacher performance has generally been the responsibility of school management and local education

authorities. However, in the context of market and performativity policies, teacher evaluation tends to be outsourced to external bodies, while standardized student tests are used to evaluate teachers' performance (and sometimes, in systems such as China, are linked to teachers' pay). In the USA, external teacher evaluation has contributed to validating alternative paths to teacher licensing (Mathis and Welner, 2015), and in Mexico, to harsh 'consequences' for teachers with lower evaluations, such as change of class or school or straightforward dismissal (Echavari and Peraza, 2017).



10.5

Cross-cutting issues

A wide range of socio-political forces, including colonial legacies, political ideology, discourses of excellence and norms, commercialization, teachers' beliefs about children and their abilities, disciplinary knowledge, etc. influence policy and practice, it remains the case that teachers are more often treated as passive objects of study than as active partners in the research enterprise. Attempts to promote 'action research' undertaken by teachers themselves have, so far, in most societies, done little to alter this. According to Day (2012, p. 8),

the work and lives of teachers have always been subject to external influence ... but it

is arguable that what is new over the last two decades is the pace, complexity, and intensity of change as governments have responded to the shrinking world of economic competitiveness and social migration by measuring progress against their position in international league tables.

In the early twenty-first century, international funding agencies, large corporations and market-oriented consultancies have increasingly encroached upon an educational research domain previously dominated by universities and national agencies. The emergence of the OECD and institutions such as McKinsey as dominant



voices in the educational debate testifies to this phenomenon. The themes of research conducted by such agencies include: teacher expectations, teachers' perceptions about how children learn (with a great emphasis on reading, writing and numeracy), teachers' understanding of language as it relates to issues of identity and nationalism, and issues of gender and marginalization. In relation to these issues, there is substantial research based knowledge to which in recent years work in educational neuroscience has also contributed (**WG2-ch7, WG3**). We discuss some of these themes below.

10.5 .1

THE POLITICS OF LANGUAGE AND IMPLICATIONS FOR TEACHERS

Language is often a key focus of debate over educational practice or 'performance', whether in relation to the teaching of literacy or

grammar, or to the importance of literature as a carrier of (national) culture and identity. But this does not imply that language is relevant to educational practices only when it is the explicit object of instruction in the curriculum or the classroom. The importance of language to education is far more subtle and pervasive. The language used in the classroom and in the curriculum has been shaped by histories of social, economic and political dominance, suppression and exclusion. Students' own experiences with and histories of language use become relevant when they come to school.

The way a student looks, holds themselves, and, of course, speaks bears on how they are treated.

Language in educational contexts plays a major role in representations of who belongs in the classroom (and in which type of school) and who does not, as well as in who is valued in a society and who is not.

The histories of languages in diverse, postcolonial societies like India are especially important in understanding classroom interaction, the institutional

In India, for example, many scholars have bemoaned the exclusion of Indigenous or Adivasi languages from schools just as many educational reform efforts have focused on them.

infrastructure of schooling and the curriculum, as well as educational policy (Kumar, 2017). For example, whether a language has a standardized variety – a written version with legal recognition including rights of use connected to institutions of power – can depend on its pre-independence evolution and relationship with state structures. In the case of India (and many other ex-colonies such as Malaysia or Sri Lanka), the independent nation has its own complex history of efforts to claim and attain recognition and legitimacy for languages or change the ways in which languages are recognized as legitimate for use and included in educational institutions. In India, for example, many scholars have bemoaned the exclusion of Indigenous or Adivasi languages from schools just as many educational reform efforts have focused on them.

Across the nations of South Asia, including Bangladesh, India, Nepal, Pakistan and Sri Lanka, historical and globalizing forces have converged toward the production of a rather pervasive distinction in the language

'medium' of a school (LaDousa and Davis, 2022). English has grown in popularity as a medium because the language captures the social and economic aspirations of people of various social classes, and so a massive increase in English-medium schooling across the region has responded to and further fuelled dreams of mobility and advancement. The alternative is manifested in the vernacular-medium school which has emerged from national and regional histories of state formation and popular culture. In a Hindi-medium school, for example, there are many different language varieties already known to students and many ways of understanding what one's mother tongue is: one's first language, one's parents' language or the language of the local community (LaDousa, 2014). While schools have always played a part in the (re)production of social class difference, there is ample evidence that, in the South Asian context, the growth in English-medium schooling is itself beginning to play a part in the way people judge the kind of English spoken



... the colonial and postcolonial order of schooling has fostered a situation whereby textbooks and exams have rendered the teacher relatively powerless to encourage the exploration of life outside the curriculum's imagination of it.

and written, while students make separate judgements about their peers' use of vernacular languages. For example, in a college hostel setting in Tamil Nadu, students – outside of the classroom – avoid the use of a Tamil that is too pure, but also the use of an English that might signal superiority or pretentiousness (Nakassis, 2016). Such guiding assumptions are key to understanding why people use language in the way they do – in which circumstances, for what ends or with what kinds of people – but which are almost never part of any official curriculum or adequately accounted for by the designated medium of instruction. If anything, the colonial and postcolonial order of schooling has fostered a situation whereby textbooks and exams have rendered the teacher relatively powerless to encourage the exploration of life outside the curriculum's imagination of it, including critical examination of the role that languages play in students' lives and the

construction of their identities.

Teachers are implicated in especially complicated ways in education and language. In South Asia and many other postcolonial societies, they have already experienced the increasing importance and status of English as they advanced through their schooling, especially after their college years. Many teachers have had to adopt strategies for teaching in a language they may seldom use outside of school.² Such strategies are oriented to the ways in which the curriculum and the examination infrastructure have been designed, demanding of students a relatively formulaic deployment of language divorced from its use in other contexts of life. This is not necessarily true of the most elite schools where teachers might be encouraged to foster the use of English (or the dominant language) for wider communicative purposes and might encourage their students to do the same. While teachers of

²Similar conditions exist for teachers from 'minority' or Indigenous communities in societies such as China or Latin America, with respect to Mandarin or Spanish/Portuguese.

... there is a balance to be struck between promotion of a shared identity and understanding of and respect for cultural or linguistic pluralism.

English face specific complexities, teachers using other languages must also confront students' frequent unfamiliarity with the standardized form of a language they consider their own. Teachers' frequent criticism or humiliation of students for speaking 'dialect' rather than the 'correct', standardized version of the national language is central to the arguments of Bernstein (1977) and others in the 1970s regarding the role of schooling in legitimating or 'reproducing' social class divides. At the same time, neglecting the importance of command of the standardized language risks endangering students' life chances and intellectual development (Honey, 1997). There is a delicate balance to be struck here.

10.5 .2

INCLUSIVE EDUCATION

Intimately related to questions of language are issues of diversity, and the capacity and willingness of

teachers to deal with these in their daily practice. Here, too, there is a balance to be struck between promotion of a shared identity and understanding of and respect for cultural or linguistic pluralism (WG2-ch4, WG2-ch8). Preparation for inclusion, particularly social and racial, is a seriously neglected area around the world. Based on research conducted for the **2020 Global Education Monitoring Report** (UNESCO, 2020), Kubacka and D'Addio (2020) examined literature on how teachers are prepared and able to deal with inclusion. Citing evidence from the **Profiles Enhancing Education Review** on inclusion and education, Kubacka and D'Addio (2020) state that while 61 per cent of a total of 168 countries provide teacher education for inclusion, most such preparation is for students with disabilities. More specifically, a review conducted in April 2019 in 59 countries of pre- and in-service teacher education (Kubacka and D'Addio, 2020) reports inadequate preparation for inclusion, with emphasis given to conceptual knowledge rather than practical pedagogy. Especially inadequate is preparation to teach



in multicultural settings and to work with immigrant students whose language is different from that of their host country. As for practicing teachers, only 59 per cent of teachers responding the TALIS 2018 survey covering 48 countries (**OECD, 2019**) considered themselves sufficiently able to adapt their forms of teaching to the cultural diversity of their students.

10.5 .3

DIGITAL TECHNOLOGY

... 61 per cent of a total of 168 countries provide teacher education for inclusion, most such preparation is for students with disabilities.

Another area in which teachers frequently lack confidence concerns their capacity to engage with digital technology – an issue that has assumed heightened urgency in the context of the COVID-19 pandemic (see following section). Digital technology is defined as ‘the ability to use information and communication technologies to find, understand, evaluate, create and communicate digital information, an ability that requires both cognitive and

technical skills’ (**Office for Information Technology Policy, 2013, cited in Jang and Weller, 2018, p. 3**) (WG2-ch6).

Expanded deployment of this technology has often not been accompanied by sufficient teacher preparation for its pedagogic use. Evidence collected as part of the 2018 PISA survey (**OECD, 2021**) showed a large variation among teachers in participating countries in the degree to which they felt they possessed the technical and pedagogical skills necessary to using digital technologies in their teaching. In both Chile and Uruguay, computers were introduced into schools relatively early, with Uruguay providing a computer to every student since 2007. However, as shown in a recent study, teacher preparation for the use of digital technology has been more informative than pedagogical in the case of Chile, and in both countries, the quality of training available in this field depends very much on the individual teacher educator’s interest and competence (**Silva, Usart and Lázaro-Cantabrana, 2019**).



10.6

COVID-19 and its implications for teachers

The disruptive effects of the COVID-19 outbreak have

impacted schools, teachers and children all over the world to a



Teachers worldwide suddenly had to experiment with what were, for most, entirely novel pedagogical techniques, in what amounted to 'emergency remote teaching'.

previously unimaginable extent. On the one hand, the crisis has stimulated unprecedented innovation within the education sector, promoting newfound appreciation for the role of teachers and educators. On the other hand, the pandemic has highlighted the severe educational implications of extreme economic and social inequality. It has brought to attention the need for better training for teachers in new methods of educational delivery, while also underlining the limitations of remote-learning technology.

The most immediate impact of COVID-19 on the lives of teachers was the sudden shift for many to online teaching. Teachers worldwide suddenly had to experiment with what were, for most, entirely novel pedagogical techniques, in what amounted to 'emergency remote teaching' (**Marshall, Shannon and Love, 2020**). In certain contexts, teachers were also required by governments to perform non-teaching duties to ensure their students' well-being.

The contexts in which teachers were forced to experiment with online delivery also varied widely. The experience of those employed by elite Indian private schools catering to children from wealthy homes was little different from that of their counterparts in many Western societies, where many teachers also approached the crisis with at least a basic knowledge of computing and internet use. However, teachers in rural South or South-East Asia or sub-Saharan Africa teaching children from more impoverished backgrounds struggled to ensure even a modicum of learning. Many were unable to switch over to screen-based learning, and for those who could, the screen was usually only twelve to fifteen centimetres wide. Meanwhile, all teachers, but especially those with inadequate facilities, limited technical expertise, and highly diverse and impoverished student populations, faced immense challenges in lesson preparation and assessment of student progress, not to mention the more pastoral elements of their role. Numerous surveys have documented these

Studies of how teachers in different parts of the world have faced the challenges of online teaching provide evidence of very similar experiences.

experiences in Chile and Portugal (**Avalos and Flores, forthcoming**), the eastern Caribbean (**Leacock and Warrican, 2020**), Indonesia (**Lie et al., 2020**), Brazil (**Fundaão Chagas et al., 2020**) and India (**Hassan, Mirza and Hussain, 2020**).

In South Asia, disruption of schooling and children's lives – often owing to the uprooting of families – was especially widespread and prolonged, with severe consequences for rural children, migrants living in urban slums and girls. The United Nations (UN) reported that 147 million South Asian children were unable to access any form of remote learning (**Menon, 2020**). Across India, many schools were turned into hunger relief centres, and teachers were asked to undertake duties such as 'issuing fines to the public for disobeying the mask mandate, facilitating the screening of incoming passengers at Delhi international airport and conducting door-to-door surveys to help identify Covid-19 cases' (**Sangal, 2021**). In 2020, at least 28,000 teachers were deployed to public health roles in Delhi.

The pandemic thus illustrated in stark form the status of Indian public school teachers as general-purpose, low-level government functionaries.

10.6 .1

CHANGED FORMS OF WORK

Studies of how teachers in different parts of the world have faced the challenges of online teaching provide evidence of very similar experiences: 'the first month we remained in a state of suspension ...'; 'plunged into a different world'; 'had to think of how to move from pen and paper assessments' (**Hordatt Gentles and Leask, 2021**). A survey of 1,730 rural teachers during the first COVID-19 year in Chile indicated that online teaching was not an option for 34 per cent of those surveyed. This meant that schools and teachers had to arrange for face-to-face delivery of printed materials on the school premises or directly to students in



their homes (**Fundação Chagas et al., 2020**). In Brazil, opportunities to interact online with students were impacted not only by rural/urban locations but also by region, and these were lower in the north-east and centre-west regions (**Fundação Chagas et al., 2020**).

At the same time, resorting to online instruction as a response to the pandemic was not always and everywhere inevitable. In Japan, as in many other contexts, teachers generally relied on the distribution of printed worksheets when schools were closed. However, as noted in **WG2-ch1**, Japan's schools were closed for only twenty-four days, reflecting a widely shared conviction that school-level education could not be delivered adequately online. This has much to do with a strong emphasis in Japan on the socializing function of schooling. But the Japanese experience also calls into question the readiness of governments in so many other societies to resort so readily to school closure as a means of curbing a pandemic that posed a relatively low health risk to children.

Teachers around the world, however, are realizing that the post COVID-19 educational world is unlikely to revert to the status quo ante.

Teachers around the world, however, are realizing that the post COVID-19 educational world is unlikely to revert to the status quo ante. Those from many countries interviewed for the ICET/MESHGuides study (**Hordatt Gentles and Leask, 2021**) spoke about continuing to use a blended approach even after their schools reopened. They also expressed a desire to capitalize on having overcome previous resistance to the use of technology and to move beyond the 'comfort zone' of traditional practices.

10.6 .2

POLICY ISSUES

The long-term effects of school closures on teachers' social, emotional and intellectual development have aroused significant international concern. Two related UNESCO recommendations include protecting the physical and social space provided by schools as well as valuing the importance

Education systems that are better prepared both in terms of equipment and teachers' technological know-how to resort to distance teaching and learning should be one widespread outcome of the COVID experience.

of teachers and the teaching profession (**UNESCO, 2020**). For its part, and with similar vagueness, the UN recommended 'reimagining education and accelerating change in teaching and learning' through strategies such as 'support for the teaching profession and teachers' readiness ... meeting students at their level and ... implementing the accelerated curricula and differentiated learning strategies likely to emerge on the return to school' (**UN, 2020**).

Despite the presumptuous notion that the COVID-19 pandemic has yielded (or is about to yield) a radical 'reimagining' of teaching, the future is likely to involve neither a technologically revolutionized 'Brave New World' nor a simple reversion to pre-COVID forms. Differences in this respect will reflect socio-economic, cultural and political divergence within and between countries, affecting both the capability and willingness of teachers and students to 'reinvent' teaching and learning in ways informed or enabled by new technology.

With reference to Singapore, Ng (**2020**) writes of 'timely change' and 'timeless constants' that mark how countries and teachers will face the future of teaching. Education systems that are better prepared both in terms of equipment and teachers' technological know-how to resort to distance teaching and learning should be one widespread outcome of the COVID experience. Giovanella, Pasarelli and Pérsico (**2020**), based on their survey of Italian teachers, offer the perhaps unsurprising conclusion that the state of preparedness there for moving to online provision was significantly better in 2020 than would have been the case just a few years earlier. But they also point to the importance of an underlying consciousness of teacher professionalism, autonomy and confidence that helped teachers to overcome many unforeseen and unforeseeable difficulties.



10.7

Conclusions

This chapter has reviewed recent research addressing several well-rehearsed themes concerning teachers and the teaching profession, encompassing teaching quality, teacher and student well-being and learning, as well as teacher education, professional development and working

conditions. Concerns about teacher scarcity in developed world contexts (**García and Weiss, 2019**), as in many sub-Saharan African countries (**USAID, 2015**), bring to the fore the importance of motivation and agency for the quality of teaching and for recruitment and retention of staff. While

material working conditions are important, and remain inadequate in many societies, valuation of teaching as a profession is also critical in affecting motivation to remain in schools. Policies that embody an excessive emphasis on the quantitative measurement of teacher performance, based on student test scores or otherwise, are widely perceived as degrading the status of the teaching profession, and seriously demotivate or demoralize teachers.

Decisions to enter the teaching profession may be influenced by intrinsic or extrinsic factors, but the quality of preparation programmes is key to transforming an initial, often naïve, enthusiasm into a professional identity founded upon assured handling of learning needs and student diversity. What future teachers get from their preparation programmes depends largely on how well their structure and content are geared to the actual contexts in which they will have to work, as differences between Swedish and German programs illustrate (Dodillet, Lundin

and Krüger, 2019). Whether delivered at undergraduate or postgraduate level, the effectiveness of teacher preparation programmes depends on striking an adequate balance between practical experience and pedagogical theory (Smith and Levi-Ari, 2005). If theory, or academic grounding in the foundational disciplines of education, is neglected, as is threatened by the swing in England towards almost entirely school-based training, then both the status of the profession and the capacity of teachers to exercise autonomous agency will be undermined (Furlong, 2013; McIntyre, Youens and Stevenson, 2019).

As well as various contentious themes in global debates over the teaching profession and teacher education, there are also several areas of clear deficiency. Early childhood educators are not being prepared in sufficient numbers and quality to staff nurseries and schools, a situation with serious long-term implications, as well as more immediate consequences for children's readiness to learn in the aftermath of the pandemic.

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Diversity and inclusiveness remain problematic, due both to increases in migration and socio-economic inequities (**Kubacka and D'Addio, 2020**). These issues require greater attention in teacher education programmes and related policies. Approaches to monitoring the quality of teacher education, as well as the performance of practicing teachers, rely excessively on quantitative metrics managed externally to teacher education institutions and teachers' own professional associations (**Mayer and Mills, 2020**), to the detriment of professional agency and autonomy.

Professional development, once limited to formal courses tasked with upgrading teachers' content knowledge or the enhancement of practical skills, has in many societies moved in the direction of collaborative learning and networking around professional needs (**Gorzoni and Davis, 2017; Anderson et al., 2019; Pérsico et al., 2020; Sancar, Atar and Deryakulu, 2021**). In its most ambitious and elaborate forms, collaborative teacher development extends to 'action research' whereby

teachers investigate and reflect upon their enactment of new learning approaches and verify their effectiveness (**Juuti et al., 2021**). While the effects of professional identity development and learning continue to be studied through surveys and conventional qualitative approaches, more recent forms include graphic representations of growth and change in teachers' professional trajectories (**Beltman et al., 2015; Hernández-Hernández and Sancho-Gil, 2019**).

The COVID-19 pandemic has been portrayed by some as ushering in an almost Copernican revolution in teaching (**OECD, 2021**). While this talk is exaggerated, critical engagement with the very real potential of technology is a challenge that teachers and education systems will need to confront. In the context of the pandemic, teachers in many countries lacked not only the skills needed to integrate digital technologies in the classroom (**OECD, 2021**), but also basic access to these tools. Some teachers have embraced experiments in 'flipped



classroom' teaching (**Bergman and Sams, 2012**) or other techniques, but many more have been left out in the digital cold. In this respect, the pandemic has starkly dramatized and exacerbated the inequities that disfigure our education systems and the societies in which they are embedded.

In the midst of the pandemic, the UNESCO Futures of Education Commission noted how teachers are coming to grips with the notion that their practice does not have to be centred on communicating information, but that it can be enriched through reflexive interaction with students, granting them enhanced



Narrow accountability measures, or quantitative tests of student performance or school competitiveness, will diminish and undermine, rather than promote, a true professionalism centred around the importance of teacher autonomy and agency.

opportunities to participate as active creators and designers who determine their own educational paths (**UNESCO, 2020**). But mastering such approaches, as well as forming professional judgements over when and to what extent digital tools can or should be deployed, will require massive additional investment in teacher education – in-service and pre-service. As indicated in a global survey administered at the end of the first year of the pandemic, no more than 30 per cent of countries had provided preparation in distance learning to more than 75 per cent of their teachers (**OECD, 2021**). If teachers lack knowledge and understanding of the potential and limitations of new technology, and the authority to decide when and how to use it, the danger is that they will increasingly be bypassed by state and corporate actors, and demoted to the status of auxiliary technicians. Besides specific preparation in the use of technology for learning, teachers will require an open mind, solid content knowledge and innovative pedagogic practices, as well as a professional identity and ethos

anchored in scientific questioning, empathy and social justice (**Rivas, 2019**).

Finally, the quality of teacher performance, teaching and teacher education rests on improving not only working conditions in those countries and locations where these are inadequate, but on policies of trust in their work and support where it is needed. That trust and support extends to a reassessment of the burden of expectation that policy-makers and the public often place on the teaching profession. Teachers cannot be expected to operate independently of their social reality, let alone single-handedly transform it, although public discourse on education often appears to expect or require this of them (**WG2-ch1**). Narrow accountability measures, or quantitative tests of student performance or school competitiveness, will diminish and undermine, rather than promote, a true professionalism centred around the importance of teacher autonomy and agency.

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ACRONYMS

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3D: Three-Dimensional

ABC

AAC: Augmentative and Alternative Communication

ABI: Acquired Brain Injury

ACC: Anterior Cingulate Cortex

ADHD: Attention Deficit Hyperactivity Disorder

AI: Artificial Intelligence

AIED: Artificial Intelligence in Educational Development

ALE: Activation Likelihood Estimation

ASC: Autism Spectrum Condition

ASD: Autism Spectrum Disorder.

AT: Assistive Technology

BDNF: Brain Derived Neurotrophic Factor

BMI: Body Mass Index

BPEB: Building Performance Evaluation

CA: Canada

CARE: Cultivating Awareness and Resilience in Education

CASEL: Collaborative for Academic, Social, and Emotional Learning

CBTS: Computer Based Tutoring Systems

CCA: Canadian Council for the Arts

CCE: Climate Change Education

CCL: Canadian Council on Learning

CD: Conduct Disorder

CDA: Cognitive Diagnosis Assessment

CNAT: Clasby Neurodiversity Assessment Tool

CPS: Collaborative Problem-Solving

CRPD: Convention on the Rights of Persons with Disabilities.

CSCL: Computer Supported Collaborative Learning

CVT: Control-Value Theory

DEF

DA: Dynamic Assessment

DBCFSN: Detroit Black Community Food Security Network

DESD: Decade of Education for Sustainable Development

DfE: Department for Education

DFID: Department for International Development

DH: Department of Health.

DI: Differentiated Instruction

DNA: Deoxyribonucleic Acid

DSD: Department of Social Development

DSM: Diagnostic and Statistical Manual of Mental Disorders

DSMMD: Diagnostic and Statistical Manual of Mental Disorders

DT: Design Thinking

DTI: Diffusion Tensor Imaging

DWCPD: Department for Women, Children and Persons with Disabilities

EBE: Evidence Based Education

ECCE: Early Childhood Care and Education

ECE: Early Childhood Education

EdTech: Education Technology



EE: Environmental Education

EEF: Education Endowment Foundation

EEG: Electroencephalography

EF: Executive Functions

EFA: Education for All

EFL: English as a Foreign Language

EfS : Education for Sustainability

EI: Education International

EN: Educational Neuroscience

ePEN: Electronic Performance Evaluation Network

ESD: Education for Sustainable Development

ESE: Environmental and Sustainability Education

FEC: Futures of Education Commission

fMRI: functional Magnetic Resonance Imaging

fnIRS: functional Near-Infrared Spectroscopy

GHI

GDP: Gross Domestic Product

GEB: General Ecological Behaviour

GHG: Greenhouse Gas

GIFT: Generalized Intelligent Framework for Tutoring

GIRFEC: Getting It Right For Every Child

GNP: Gross National Product

GPE: Global Partnership for Education

GWAS: Genome-Wide Association Study

HCT: Human Capital Theory

IPCC: Intergovernmental Panel on Climate Change

IPS: Intraparietal Sulcus

IQ: Intelligence Quotient

IRT: Item Response Theory

ISEE Assessment: International Science and Evidence based Education Assessment

ISTE: International Society for Technology in Education

JKL

J-PAL: Abdul Latif Jameel Poverty Action Lab

KBS: Keep Back Straight

LA: Learning Analytics

LAC: Latin American Country

LATAM: Latin America

LGBTQ+: Lesbian, Gay, Bisexual, Transgender, Queer or Questioning

LMICs: Low- and Middle-Income Countries

LTD: Long-Term Depression

LTP: Long-Term Potentiation

LUOTS: Lightning Up the Old Train Station

MNO

MA: Millennium Ecosystem Assessment

MBE: Mind, Brain and Education

MDES: Minimum Detectable Effect Size

MDG: Millennium Development Goal

MEG: Magnetoencephalography

ACRONYMS

MOOC: Massive Open Online Course	PERMA: Positive Emotions, Engagement, (positive) Relationships, Meaning, and Accomplishment	RtI: Response to Intervention
MRI: Magnetic Resonance Imaging	PET: Positron Emission Tomography	SDG: Sustainable Development Goal
MTSS: Multi-Tier Systems of Support	PFC: Prefrontal Cortex	SDM: Summary for Decision-Makers
NAPLAN: National Assessment Program – Literacy and Numeracy	PGS: Polygenic Score	SEAL: Social and Emotional Aspects of Learning
NCEE: National College Entrance Exam	PISA: Programme for International Student Assessment	SEF: Stage-Environment Fit
NCLB-Act: No Child Left Behind-Act	PISA-D: PISA for Development	SEL: Social and Emotional Learning
NCP: Nature's Contribution to People	POC: People of Colour	SEND: Special Educational Needs and Disabilities
NEA: National Education Association	POE: Post Occupancy Evaluation	SES: Socio-economic Status
NEP: New Ecological Paradigm	PTE: Pearson Test of English	SLD: Specific Learning Disability
NGO: Non-Governmental Organization	PTSD: Post-Traumatic Stress Disorder	SMART: Stress Management and Resiliency Training
NRC: National Research Council	R&D: Research and Development	SNP: Single Nucleotide Polymorphisms
OECD: Organisation for Economic Co-operation and Development	RAN: Rapid Automatized Naming	SOGIE: Sexual Orientation and Gender Identity Expression
PQRS	RCP: Representative Concentration Pathways	STEAM: Science, Technology, Engineering, Arts and Mathematics
PBL: Project Based Learning	RCT: Randomized Controlled Trial	STEM: Science, Technology, Engineering, and Mathematics
PE: Physical Education	RD: Reading Disorder	
	REM: Rapid Eye Movement	
	ROI: Return on Investment	



TUV

TALIS: Teaching and Learning International Survey

TBI: Traumatic Brain Injury

TFI: Teach for India

ToM: Theory of Mind

TPB: Theory of Planned Behaviour

TPJ: Temporoparietal Junction

UDL: Universal Design for Learning

UK (or U.K.): United Kingdom

UKABIF: United Kingdom Acquired Brain Injury Forum

UN: United Nations

UNCRC: United Nations Convention on the Rights of the Child

UNDESA: United Nations Department of Economic and Social Affairs

UNDESCD: United Nations Decade of Education for Sustainable Development

UNEP: United Nations Environment Programme

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNESCO MGIEP: UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development

UNFCCC: United Nations Framework Convention on Climate Change

UNICEF: United Nations International Children's Emergency Fund

UNPF: United Nations Population Fund

UNPFA: United Nations Fund for Population Activities

USA: United States of America

USSR: Union of Soviet Socialist Republics

VRU: Violence Reduction Unit

VS: Ventral Striatum

VUCA: Volatile, Uncertain, Complex and Ambiguous.

WXYZ

WEIRD: Western, Educated, Industrialised, Rich and Democratic

WG1: Working Group 1 (of the ISEE Assessment)

WG2: Working Group 2 (of the ISEE Assessment)

WG3: Working Group 3 (of the ISEE Assessment)

WG4: Working Group 4 (of the ISEE Assessment)

WHO: World Health Organization

WSSD: World Summit on Sustainable Development

WWF: World Wide Fund for Nature

ZPD: Zone of Proximal Development

GLOSSARY

GLOSSARY

WORKING GROUP - 2



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4R framework

The 4R framework refers to four ways through which education can promote peacebuilding 1) equitable distribution of educational resources and services (Redistribution); 2) representation of diverse communities in educational decision-making (Representation); 3) recognition of cultural diversity in the curriculum (Recognition); and 4) promotion of conflict-sensitive and reconciliatory pedagogical approaches to address legacies of conflict (Reconciliation).

ABC

Amygdala

The amygdala is a subcortical brain structure and is part of the limbic system (as are the hypothalamus and hippocampus). The amygdala is critical for learning (e.g., forming memories) about the emotional significance of (positive and negative) stimuli, emotion processing and emotional responses, but has also been implicated in processes such as memory processing, motivation, anticipating reward, and decision making. The amygdala - therefore - is involved in all learning, most notably social-emotional learning. Furthermore, the amygdala is closely linked to activity of the HPA-axis.

Anthropocene

The term 'Anthropocene' refers to the period of time during which human activity started to influence planetary systems in highly detrimental ways.

Assessment in the context of learning and education

Assessment in the context of learning and education operates at various levels of education systems: students, teachers, schools and entire systems themselves. Assessment can be seen as a constant activity occurring during formal or informal teaching as a teacher evaluates student understanding and reflects on their work, and as students reflect on and regulate their own learning (learner or student assessment). Assessment occurs constantly throughout one's life and offers evaluation and feedback on one's progression in relation to any problem or task. Furthermore, assessment is also a formal practice that occurs at the teacher, school and policy-making level.

Assessment as learning

Assessment as learning refers to the process whereby students are able to learn about themselves as learners and become aware of how they learn. This form of assessment often includes self-assessment and peer-assessment.

Blended learning

Blended learning combines traditional classroom learning methods with online learning modalities.

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WORKING GROUP - 2

Citizen science

Citizen science is a scientific approach that brings in members of the general public to design and implement research projects with viable and useful data.

Colonialism

Colonialism is a practice or policy of control by one people or power over other people or areas, often by establishing colonies. In the process of colonization, colonizers may impose their education systems and practises, and other cultural practices upon the people or areas that are colonized.

Cognitive empathy

Cognitive empathy is the ability to put oneself in ‘other people’s shoes’ (perspective taking) to understand their thoughts, intentions and actions.

Conflict (in education)

In the ISEE Assessment, we conceptualize ‘conflict’ in education broadly in physical, cultural and structural forms - from disruption of learning and experience of violence, to exclusionary policies, inequitable access to educational resources, and educational practices that involve cultural repression, misrecognition and stereotyping of socially disadvantaged groups.

Context (in education)

In the ISEE Assessment, we conceptualize ‘context’ in education at three stages that shape educational practice and are

important for educational transformation: 1) macro-level cultural, social, political, historic, ethical, economic and environmental forces operating on the global and national levels; 2) the ‘political economy of education’, challenges posed by diversity (in various forms) and conflict, technological change, and developments in educational neuroscience, and 3) contextual matters of immediate relevance for day-to-day teaching and learning (i.e., curriculum and pedagogy, assessment and the teaching profession). Although conceptually distinguishable, these contextual factors operate in the same societal spaces and mutually influence each other.

Cosmopolitanism

Cosmopolitanism refers to international understanding showing an interest in different cultures, ideas, etc.

COVID-19 (pandemic)

COVID-19 refers to a coronavirus that first emerged in December 2019 and has led to a pandemic in 2020-2021 (which is still continuing at this time of writing) resulting in lockdowns and school closures across the world.

Cultural context

The cultural context refers to systems of collective expression that show variations around the globe in various societies.



Cultural neuroscience

The field of cultural neuroscience takes into account how cultural variation across the globe might influence not only how people think and act, but also how this influences brain functioning.

Curriculum

Curriculum constitutes the content of education. Curriculum is not necessarily a predetermined programme of activities and goals that need to be implemented, but rather is seen as a ‘complicated conversation’ among teachers, students, parents, politicians and commercial actors like textbook publishers.

DEF

Digital divide

Digital divide in the ISEE Assessment refers to inequalities in access to and use of EdTech. In education, the digital divide is currently discussed at three levels: (1) access/infrastructure; (2) skills/uses; and (3) mastery/outcome.

Distance learning

Distance learning is characterised by an information delivery mechanism where the educator and learner are separated in both time and space.

Diversity

Diversity is defined in this Assessment as differences that make social groups and individuals different from the majority ‘normal’, and include race, ethnicity, language, tribe, religion, gender, sexuality, social class, disability, and neurodiversity (learning difficulties/learning disabilities), as well as intersectionality among diversity types.

Ecopedagogy

Ecopedagogy is an emergent pedagogical approach to restoring and regenerating healthier connections between humans and the planet.

Economic context

The economic context refers to systems of capital exchange, often in the form of entrepreneurship, commercialization and capitalization.

Education

Education is a societal process that shapes human behaviour and social action. It stands for three central types of activities of teachers and students, namely teaching, learning and evaluation, each of which expresses a particular relationship with the actors involved. Education can be framed as a broad, complex system consisting of a set of human and non-human elements and the relationships between them, for example, teacher–student, self–other, self–self, self–society, self–ecology.

GLOSSARY

WORKING GROUP - 2

Human elements include students, teachers, administrators, parents, policy-makers, stakeholders and various others. Non-human elements comprise learning spaces - classes, schools, virtual, outdoor, textbooks, etc. The term complex system entails the presence in the system of a group of multiple components working both independently and interdependently that prevent the system from being fully controlled and predicted, hence it is bound to evolve in unexpected ways.

Education for Sustainable Development

Education for Sustainable Development empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity.

Educational neuroscience

Educational neuroscience researches the brain to understand mechanisms of learning to improve learning outcomes and experiences by informing teaching and learning practices.

Education technology (EdTech)

Technology refers to the artefacts that are invented or adapted with the purpose of addressing human challenges. In this context, artefacts can assume a material (i.e. computer hardware) or non-material (i.e. software) form; technology also includes associated processes that

surround the use of the artefacts. EdTech refers to any technology (process or tool) applied in an educational context or as a solution to an educational problem.

Emotional (affective) empathy

Emotional empathy and affective empathy are used interchangeably and defined as the capacity to respond with an appropriate emotion to another's mental states. It is based on emotional contagion.

Emotion regulation

Emotion regulation refers to recognizing and managing emotions.

Empathy

Empathy is an emotion through which one shows compassion for another person's distress. Empathy also refers to the ability to understand and share the emotional and cognitive states of others. It is a key social relational function that acts as a pathway to higher-order prosocial behaviour, including bonding and forming meaningful relationships, cooperation and moral decision-making.

Empathy for nature

Empathy for nature is the ability to (imaginatively) share the emotional experience of the natural world.

Environmental education

Environmental education is an



educational movement that develops and enhances environmental attitudes, values, and knowledge, builds skills that prepare individuals and communities to collaboratively undertake positive environmental action, and facilitates connections between actionable research findings and on-the-ground practices.

Equity in education

Equity in education means that personal or social circumstances, such as gender, socio-economic status, ethnicity, migrant background, age, special needs or place of residence, do not hinder the achievement of one's educational potential and that all people reach at least a minimum level of skills.

Equity in education distribution

Equity, or merit based equality, in the distribution of education indicates that opportunities for further study should be given to those who demonstrate the most potential to benefit from them, and that rewards for 'merit' motivate individuals to achieve excellence.

Executive functions

Executive functions are a class of cognitive processes that are thought likely to facilitate academic performance. Executive function abilities are defined as a set of separable, but overlapping, cognitive skills comprised of: 1) working memory, defined as the ability to hold information in mind and update it; 2) inhibitory control/response inhibition, defined as the ability to inhibit a highly learned response to a stimulus in favour of a less dominant response; and 3) cognitive flexibility/set

shifting, defined as the ability to attend to distinct but closely related aspects of a given set of stimuli, such as the ability to group a set of objects by the dimension of colour and then by the dimension of shape. Collectively, these skills enable individuals to focus attention, regulate impulses, switch between competing demands, and engage in goal-directed activities.

Formal education

Formal education refers to the structured education system that runs from primary (and in some countries from nursery) school to university, and includes specialized programmes for vocational, technical and professional training.

Formative assessment

Formative assessment or 'assessment for learning', is a form of educational assessment used to (daily) monitor students' learning progress and provide feedback over the course of an instructional unit to identify students' learning needs and adjust teaching accordingly to improve students' achievement and enhance ongoing learning.

GHI

Hippocampus

The hippocampus is a brain structure located in the allocortex and is part of the limbic system (as are the amygdala and hypothalamus). The hippocampus is primarily involved in memory processes and learning. Furthermore, the hippocampus is closely linked to activity

GLOSSARY

WORKING GROUP - 2

of the HPA-axis.

Holism in educational neuroscience

In educational neuroscience, a holistic or emergentist mode of explanation refers to the idea that the brain is a complex, dynamic system. In this paradigm, brains are coordinators of dynamic patterns of embodied (sensori-motor) interactions with one's surroundings. Thus, in this paradigm the brain's context is taken into account.

HPA-axis

The hypothalamic pituitary adrenal (HPA)-axis is a biological stress system (i.e. neuroendocrine system) that controls reactions to stress as well as many body processes. HPA-axis activity follows a circadian rhythm and is activated in response to cognitive (e.g. fear, excitement, anxiety) or non-cognitive (e.g. infection) stressors. Furthermore, the HPA-axis is closely linked to activity of the amygdala and hippocampus.

Human capital

Human capital refers to people's knowledge, skills and abilities that can increase production and contribute to economic growth and employment. The human capital approach to education proposes that education has a vital economic role. It (therefore) sees the domains of reading, mathematics and science (as opposed to, for example, the arts, humanities, physical education,

and social skills) as critical for preparing individuals to fulfill their productive potential and thus contribute to maximizing national or corporate economic performance.

Human flourishing

Human flourishing is both the optimal continuing development of human beings' potentials and living well as human beings. Living well as a human being means being engaged in relationships and activities that are meaningful, that is aligned with both their own values and humanistic values, in a way that is satisfying to them. Flourishing is conditional on the contribution of individuals and requires an enabling environment (e.g. fulfill basic biological and existential needs). It can be regarded as a particular interpretation of well-being. Furthermore, flourishing involves community and is an interpersonal, not a personal pursuit.

Information literacy

Information literacy is the ability to properly handle information and involves the ability to a) determine the nature and extent of the information needed, b) effectively and efficiently access needed information, c) evaluate information and its sources critically and to incorporate the information into the personal knowledge base and value system, d) summarize and synthesize the main ideas to be extracted from the information and to construct new concepts, and e) use information effectively to accomplish a specific/ethical



purpose.

Interdisciplinary/Multidisciplinary/ Transdisciplinary

These three terms, used interchangeably in the ISEE Assessment, refer to combining and/or involving several academic disciplines or professional specializations in assessing education and learning.

JKL

Learning

Learning refers to coming to make sense of what one is taught and happens when students' potentialities are evoked to come to understanding in agential ways of being and acting. Learning would fail to be learning if students' potentials are not evoked in the quest to gain understanding, and insight, and be encouraged to embark on an academic, political, economic, social and environmental journey with a quest for human flourishing. The broad perspective of learning encompasses learning as process, as experience, and as outcomes. Learning is a process of active meaning-making situated in context, based on which relatively permanent changes occur within any one or more of the following: human dispositions, capabilities, knowledge, behaviours, values, attitudes, and/or preferences. Learning thus involves relational, embodied, affective and non-conscious ways of knowing and is inherently social, emotional, relational and affective. Learning is heavily influenced by cognitive, emotional,

motivational and social brain processes that are all interdependent, as well as by culture (e.g. value and belief systems and practices shared by groups) and other environmental factors (e.g. socio-economic status).

(Specific) Learning disability

A (specific) learning disability traditionally refers to any (neurobiological) condition that impairs a child's ability to learn. It arises when persistent difficulties acquiring academic skills are unexpected in the context of age and grade level standards. Most common learning disabilities are in the areas of reading (dyslexia), mathematics (dyscalculia) and/or written expression (developmental coordination disorder or dysgraphia). This 'pathology', 'deficit', or 'medical' model views neurological differences as impairments and deficits, and has recently been complemented with the view of atypical learning or neurodiversity.

Low-, middle-, high-income countries

Using the World Bank Atlas method, low-income economies are defined as those with a GNI per capita of \$1,045 or less in 2020; lower middle-income economies are those with a GNI per capita between \$1,046 and \$4,095; upper middle-income economies are those with a GNI per capita between \$4,096 and \$12,695; high-income economies are those with a GNI per capita of \$12,696 or more.

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MNO

Marketization of education

Marketization refers to new forms of educational governance (quasi-markets) that seek to make educational organisations more efficient, responsive and innovative by exposing them to market pressure.

Merit based equality

The merit based distribution of education or ‘performance principle’ guides the distribution of slots in higher levels of schooling and universities through the assessment of performance (e.g. academic). The basis of this principle is that opportunities for further study should be given to those who demonstrate the most potential to benefit from them, and that rewards for ‘merit’ motivate individuals to achieve excellence. Merit based distribution is variously called the ‘performance principle’ and is also known as ‘equity’.

Meritocracy

Meritocracy is an ideology that claims that social opportunities and economic rewards should be distributed solely on the basis of individual achievement, talent or merit, and not on extraneous factors such as social origin, gender, ethnicity or sexual orientation. It is one of the most influential educational and social ideals of modernity.

Mindfulness

Mindfulness refers to both a mental state and a set of practices that are characterized by two components: 1) the self-regulation of attention, so that it is maintained on immediate experience, thereby allowing for the increased recognition of mental events in the present moment; and 2) the adoption of an orientation towards one’s experiences in the present moment, characterized by curiosity, openness and acceptance. Mindfulness has as its foundation awareness of breath, body, mind (thoughts and emotions), and phenomenal experience. Mindfulness practices tap cognitive processes (attention and executive functions) as well as social-emotional skills (prosocial behaviour, emotion awareness).

Natural capital

Natural capital refers to the world’s renewable and non-renewable natural assets such as fisheries, forests, agricultural land, fossil fuels and minerals.

Nature’s contributions to people

Nature’s contributions to people refers to all the contributions, both positive and negative, of living nature (i.e. diversity of organisms, ecosystems, and their associated ecological and evolutionary processes) to the quality of life for people.

Neo-colonialism

Neo-colonialism is the practice of using



economic imperialism, globalisation, cultural imperialism and conditional aid to influence a developing country.

Neoliberal educational paradigm

Neoliberalism is a cluster of politico-economic ideas that relate individuals (citizens, consumers) to power (governments) and money (economies). At its simplest, neoliberalism is a vision of small government that commodifies more and more areas of society to bring them into the market economy for profit and capital accumulation. A neoliberal approach to or view of education sees education as based in a human capital orientation: education is a rich terrain for commodification, commercialization and capital accumulation. The neoliberal educational paradigm promotes a decreasing role of the government and an increased role of marketization and the private sector in education, as well as national and international comparative forms of formative assessment/ performance metrics (such as the enhanced role of PISA).

Neuroplasticity

Neuroplasticity (or neural plasticity) refers to the anatomical and functional changes of the brain underlying cognitive and behavioural changes during development in relation to place, time and context-specific experiences or in response to an intervention, for example, learning or training.

Neuromyth

A neuromyth refers to a misconception generated by a misunderstanding, a misreading or a misquoting of facts scientifically established (by brain research) to make a case for use of brain research, in education and other contexts. Neuromyths, broadly, are overly simplified facts about the brain that lead to suggestions about learning in general as well as teaching practices that are incorrect. Their mythical status means they are enduring: even when the claims are repeatedly shown to be false, they continue to circulate as scientifically based truths.

Neuroscience

Neuroscience, as a field of research, includes neurochemistry, molecular biology, electrophysiology, neuroanatomy, neurophysiology and neural network studies.

Objective equality

Objective equality or ‘simple equality’ refers to treating everyone in an identical manner in distributing education to a specified group, regardless of individual backgrounds, needs and attributes.

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PQRS

specifically designed for low- and middle-income nations.

Pedagogy

Pedagogy (in education) can be conceived of as the arrangements (spaces, actions, conduits and levers) that facilitate teachers' curriculum and is shaped by political as well as policy influences, inevitably structured by culture and in many countries, by the legacies of colonialism, imperialism, and conflict.

Peer assessment

Peer assessment, widely used in collaborative learning settings, involves students providing feedback to other students on the quality of their work. The practice of peer feedback usually includes the assigning of a grade, or peer-related exchange and discussion of student assignments.

PISA/PISA-D

PISA, the OECD's Program for International Student Assessment, is a triennial international large-scale assessment of students' performance in the domains of literacy, mathematics, and science. In recent years, PISA metrics have been expanded to incorporate non-cognitive skills, such as social and emotional skills, global competency, creativity, and well-being, as well as 'global competence' (since 2018). In 2014 PISA-D (PISA for Development) was introduced. PISA-D can be seen as an adaptation of the existing PISA test,

Political context

The political context refers to systems of power, often in the form of legislated policies, funding directives and standards.

Political economy of education

A political economy of education approach provides a contextually informed, interdisciplinary approach to education and economics. It means that economic processes and outcomes are embedded within social relations and that the association between education and economics is mediated by contextual factors such as state structures, legal frameworks, culture, political and religious ideologies and by social relations of class, ethnicity and gender.

Prefrontal cortex

The prefrontal cortex (PFC) is a brain region located at the front of the frontal lobe. The PFC is linked to a variety of complex behaviours and processes such as metacognitive skills including monitoring of attention, emotions and thinking patterns, and executive functioning skills (e.g., working memory, inhibition/cognitive control and cognitive flexibility). The PFC regulates the activity of the limbic system.



Privatization of education

Privatization of education refers to the multiple ways in which the private education industry increasingly participates in and re-shapes education around the world.

Reductionism in educational neuroscience

In educational neuroscience, (explanatory) reductionism refers to the idea that learning behaviours can be explained in biological (e.g., neuromolecular, neurological) terms. A reductionist explanation typically uses metaphors of levels and mechanisms: biological organization at a higher level is explained by mechanisms at a lower level. Applied to learning and education, cognitive phenomena at a higher level (the learner as person) are analysed into basic (cognitive) components (e.g., attention, memory, thought, perception and judgement) and then explained by neurological mechanisms at the lower level (the brain). Thus, cognitive phenomena such as attention, etc., are explained by localized neurological mechanisms. This paradigm assumes that learning is context-free.

Science

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence.

SDG 4.7

At the 70th Session of the UN General Assembly in September 2015, member states adopted the 2030 Agenda for Sustainable Development. It aimed to engage the nations of the world towards collectively promoting sustainable development, decreasing global inequalities, and realizing universal quality education. At the heart of the Agenda were seventeen Sustainable Development Goals (SDGs), including SDG 4, which covers education seeking to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'. In SDG 4.7, it is highlighted that by 2030 it should be ensured that all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Self-assessment

Self-assessment (or assessment as learning) is a kind of formative assessment during which students reflect on and evaluate their work or learning, judge the degree to which they reflect upon explicitly stated goals or criteria, identify strengths and weaknesses in their work, and revise accordingly.

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Self-determination theory

Self-determination theory is a ‘needs’ theory of motivation positing that humans have three universal psychological needs, namely: the need for autonomy, the need for competence, and the need for relatedness, which promote optimal human functioning and well-being. The need for autonomy is satisfied when behaviour, feelings and thoughts are experienced as one’s own choice and self-endorsed. The need for competence describes a sense of mastery in activities that one considers important. The need for relatedness concerns the sense of connectedness with those who are important to an individual, in the school context, for example, teachers and peers at school.

Shadow education

Shadow education refers to private tutoring, supplementary to formal education.

Social cohesion

Social cohesion refers to two broad features of a society: 1) ‘the absence of latent conflict whether in the form of income/ wealth inequality, racial/ ethnic tensions, disparities in political participation, or other forms of polarisation; and 2) the presence of strong social bonds measured by levels of trust and norms of reciprocity, (i.e., social capital), the abundance of associations that bridge social divisions (civil society), and the presence of institutions of conflict management (e.g., a responsive

democracy, an independent judiciary).

Social context

The social context refers to a realm of society integrated by a sense of community (solidarity), rather than power (the political realm) or money (the economic realm).

Social justice (in education)

Social justice in education entails two elements: 1) distributive justice, that is, equality/equity in distributing educational opportunities and rewards; and 2) the content of education, that is, how differences play out in deciding on and enacting what schools teach and what students learn at school, and with what consequences.

Social and emotional learning (SEL)

SEL involves the processes through which people acquire and effectively apply the knowledge, attitudes, skills and competencies to recognize, understand and manage their emotions, feel and show empathy, care and concern for others, establish and achieve positive goals, develop and maintain positive relationships, make responsible decisions and handle challenging situations.

Subjective equality

Subjective equality or ‘prioritizing the least advantaged’ acknowledges the special



needs of students deriving from their differences and advantages/disadvantages.

Summative assessment

Summative assessment or ‘assessment of learning’ is a form of (often standardized) educational assessment typically given at the end of an instructional unit (e.g. a course or grade level) to assess student learning outcomes in order to find out whether they have attained a predefined set of standards, expectations or instructional goals, or as a selection method to follow up educational tracks or the labour market. In addition to evaluating learners, summative assessment also describes the process of evaluating the effectiveness of sequences of instructional activities to provide information for judging the overall value of an education programme - as well as for ranking schools and education systems.

Sustainability science

Sustainability sciences are the collective of the economic, environmental, geographical, population and earth system sciences.

Systemic social emotional learning (SEL)

Systemic SEL is an approach to create equitable learning conditions that actively involve all pre-K to grade 12 students in learning and practising social, emotional, and academic competencies.

TUV

Teaching

Teaching refers to the activity in which the teacher provokes students to come to an understanding. Teaching is an activity in which an intention to propel changes in knowledge, understanding, behaviour, attitude or opinions in a student is exercised in a nurturing way through diverse forms of human expression, such as speech, bodily demonstration, art, and silence. In contrast to notions of ‘training’ or ‘instruction’, the concept of ‘teaching’ encompasses the relationship between teachers and students, their shared interest in the learning process and, most importantly, an imaginative or creative sympathy joining the minds of teacher and student.

Theory of planned behaviour

The theory of planned behaviour (TPB) posits that behaviour change must be preceded by intention to change which, in turn, is determined by the fulfilment of three conditions: a) individuals should display pro-environmental values and beliefs; b) their values and beliefs should be congruent and supported by the social norms of their community; and c) they should believe they have enough agency to cause positive change.

Transformative education

Transformative education empowers learners to become agents of change for equitable and sustainable societal outcomes.

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Transformative social emotional learning (SEL)

Transformative SEL is concerned with advancing equity in access to resources and outcomes in education. Transformative SEL competencies focus on identity, intersectionality, agency, belonging and engagement as central to furthering social-emotional development and achieving equity in education.

Twenty-first century competencies/Skills

These are the skills, competencies, abilities and learning dispositions identified as necessary for success in twenty-first century society and work places by the education community.







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