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Identity and Teacher Professional Development

A Reflective, Collaborative and Agentive Learning Journey

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I must remember at all times that the real leap

is to bring the invention into existence.

In the world I travel to, I create myself endlessly

(Franz Fanon, 1952).

Introduction

In the current four ages of professionalism (Hargreaves, 2000), the teacher's figure has to be reimagined, and a new agenda for teacher education research formed. What are we now preparing teachers for?

This book, *Identity and Teacher Professional Development: A Reflective, Collaborative and Agentive Learning Journey*, invites a holistic reflection in the current time and place in which the teacher work is situated today, also considering the recent experience of the global crises due to COVID-19. A new view of the future and what it means to be a teacher in this changing and largely unknowable context have to be shaped in a broader global discussion. In its disruptive impact, the COVID-19 crisis accelerates the assumption of taking a risk in adopting new perspectives.

The focus of this book is Identity and Teacher Professional Development. Profession and professionalism are abstract concepts, expressed in actions, experiences and knowledge. For these reasons, they can be investigated only indirectly, finding traces in the form of their manifestations. Professionalism can also give information on the teachers' habitus (Bourdieu, 1972), closely connected with the tacit dimension of experience. This book is organised as a journey to dig inside the concept of teacher profession and professionalism. A path that has to be collaborative, agentive and dialogical:

- By "collaboration", we mean switching the teacher's personal and professional development from an individual and solitude process toward a joint discovery, mutual enrichment, and shared directionality.
- By "agentive", we mean the ability to activate internal and external resources to put at the service of individual, productive and communicative transformation;
- By "dialogical", we refer to the ability to enrich the personal narrative with others' voices, opening spaces for dialogue and listening.

The book goes in the direction to extend the definition of what it is a quality professional development for teacher—as discussed in TEPE conference in 2019:

- In Europe, there is a relatively static concept of teacher quality. Many countries have quality criteria for teachers (in terms of competence standards, qualification

frameworks, etc.). Still, most of these quality criteria only describe one set of indicators that teachers need to have when they start teaching.
- This static understanding of teacher quality is partly due to the profession's relatively isolated structure (usually alone with the students in classrooms), preventing a perspective of growth and development supported by the whole institution.
- There is a narrow focus on 'qualification'. There is less emphasis on socialisation and personal realisation, with a rigid separation between formal and informal professional developing and learning.

At the same time, this would be an open path of reflections for supporting the eight challenges for the field of teacher education research as proposed by Biesta, Takayama, Kettle and Heimans (2020), here reported in a synthetic version:

- Reclaim a practically meaningful, intellectually rigorous and politically astute conception of teaching;
- Deepen, add to, or critique the current "empirical" focus of teacher education research;
- Employ or develop theoretical and methodological resources that are relevant to teacher education with the politics of Global South/North designation;
- Take seriously the ecological precarity of the planet and how teacher education is implicated;
- Engage strongly with the politics of language and culture in teaching and teacher education across diverse educational contexts;
- Identify the roles of organisations such as OECD, UNESCO, World Bank and Asia Development Bank;
- Identify resources that will help to strengthen the field conceptually with cognitive jurisdiction implications;
- Re-engage with the politics of education as teacher educators for an educational conception of education.

Identity and Teacher Professional Development: A Reflective, Collaborative and Agentive Learning Journey book would like to propose a broad dynamic understanding of the journey of teacher professional development. Indeed, it drives the reader from the entrance of student-teachers into the profession towards the open challenges in the hands of teacher educators. This book proposes an analysis of the features that shape the teacher's journey, structured in separate chapters. The chapters are organised to give flow and pace to the unfolding story. A whole range of research and literature informs the reader.

Chapter 1, "Becoming a Teacher: To be a Teacher", discusses teacher professional identity; the passage from theory to practices and content to activity. In general, teachers should be actively involved in their work, driven by the passion for teaching, enthusiasm, satisfaction and self-motivation, considering knowledge as a resource to mobilise. So, future teachers must be prepared to assume multiple roles in a multi-cultural society and become an actor of change in their community. A topic already widely discussed but still relevant is how to tackle the transition from theory to teachers' practice in education to successfully link pedagogical knowledge

and classroom practice (Cochran-Smith & Zeichner, 2005). The entry into the role represents an essential phase of the professional life of a teacher. Once in class, the new teachers have difficulty paying attention to the critical elements of the learning and teaching process (Star & Strickland, 2008) and dealing with the complexity of classroom interactions. The student-teacher is confronted with a complex transition during teacher education. In this chapter, we explore the student-teachers' challenges during teacher education to enter into the institutional role and shape the new professional identity. A research about a teacher-student in the French context is discussed, followed by a focus on the passage from novice to expert.

Chapter 2, "Supporting the Teacher Professional Development," discusses the central role of the teacher's reflective process. In-service teachers need to continuously update their role and keep up with the constant evolution of society. In this chapter, the reflective practices are discussed, focusing on some tools like the e-portfolio and the digital video. The concept of diffractive practitioner and the teacher's discussion as an immigrant and as an ally is open to deal with new rapid societal changes.

Chapter 3, "The Role of the Personal Resources in Teaching Practices", explores the personal resources of self-efficacy, self-regulated learning, teacher agency and readiness. As shown by some research, these internal resources help teachers be able and willing to address educational changes and introduce innovation in their teaching practices. A discussion is open to question the contemplative practices, concerning funds of knowledge and funds of identity that valorise teachers' past and emotional life to valorise the subjective resources.

In Chapter 4, "Role of the Tools and Information and Communications Technology (ICT) in Teaching Practices", the topic of appropriation of new technology is explored. For a long time, the classroom walls and the school were a limited space where students shaped their learning. This "broadcasted mode" gives a central role to teacher and academic books. Technology, multicultural dimension and continuous social and economic change have disrupted and undermined this traditional system: the environment of learning has multiplied, going online into the cloud. In this chapter, the concept of appropriation, tools and scripts is introduced, with a research example of teachers' appropriation of the iPad in the classroom. Then, the perspective of socio-materiality is considered as a framework to analyse teaching practices. For this, research is presented about ICT social and material appropriation, focusing on artefacts in a socio-cultural approach. Critical views of educational technology are useful in considering the impact of global crises, such as Covid-19, when questioning traditional curricular theories.

In Chapter 5, "Role of the Context and Social Interaction in Teaching Practices", the dimension of participation and collaboration is discussed in the light of learning and professional development. Participation is a social experience that triggers negotiation processes, especially when there are some goals, shared resources and modality of action (Van As, 2018). Participation and collaboration push towards innovation in leadership by building new links between individual action and social change. Knowledge building in the classroom shows the power of the social dimension in the learning process. The peer collaboration between teacher and researchers

is conceptualised as a professional dynamic oriented to transformative change. The potentiality of peer collaboration is progressively shaped by digital social media, like social networks, which impact practices and modalities of access to resources. A relational agency is activated to build epistemic collaborative communities that could support change and introduction of innovation.

In Chapter 6, "International and Global Professional Developing", the profound transformation of the educational system for teacher education in many countries is discussed. Globalisation has led to a growing internationalisation of education. Cultural plurality with great professional learning potential characterises international teaching courses (Oolbekkink-Marchand et al., 2017). Maximising the benefits of professional learning for an international teacher does not depend exclusively on the quality of teaching, but also on the participants' activity and their ability to reconcile knowledge between learning and work. In this chapter, teacher education is discussed, focusing on the role that teacher educators could play for the next generation of teachers. An example of a capacity-building project for teacher educators has described the potentiality of blended learning for international teacher communities. In the same time, it is important to question the sustainability of competencies in the indigenous context for a so-called "ethical-critical global pedagogy" open to conversation and dialogue.

In Chapter 7, "Open Perspective", the readers are invited to open a discussion on the implication of emergent technology, such as virtual reality, robotics and augmented reality, on teacher practices in the classroom on a practical level, but also for a broader impact on professional development. Some discussion points in current educational literature are also explored towards a posthumanist/hyper human teacher professional development, considering the need for critical and participative meaning-making in times of difficulty.

The chapters provide a sense of cohesion across the developing storyline of teacher identity. The first chapter is explicitly addressed to teacher-students entering into the profession. Then, the following chapters are dedicated to the teacher in service. Simultaneously, all the chapters can be used by teacher-educators, taking into consideration the different nuances of the teaching path. Readers, educational-students or researchers will find a theoretical perspective and a practical suggestion inviting to the research the interpretation of teacher activity and the identity engagement implication for the teacher role. The book is a potential reference point for teacher-students: teachers-in service, teacher educators and researchers involved in their professional development and looking for new perspectives. Adopting a broad view (Eastern knowledge, Global South, indigenous ways of knowing), the book might be relevant and applicable beyond 'the west' in an open dialogue.

At the same time, this is a journey of both promotion of IT-based new teaching-learning solutions through e-community approaches and practical guidelines for how to put these into practice. For this, some insights are provided to administrators who need to make ICT decisions and master teacher education courses. The book pushes thinking into new spaces and reflexive dimensions in taking the reader on a journey, mainly providing:

– A sense of open cohesion developed across the developing storyline of teacher identity.
– A view of the future and what it means to be a teacher in this changing and largely unknowable context, as the COVID struggle and postmodern society suggest.
– The potential to speak to teachers and teacher educators globally, embracing implications from global perspectives and emerging technologies.

The invitation is to discover and follow the journey of teacher professionalism in different social and cultural aspects, in particular in difficult times. The concepts and models propose a broad perspective on teacher roles and implications for teacher education. In the end, the teacher emerges as a complex figure, strictly articulating with other social, economic and material dimensions.

The quality of teaching and quality teachers is a complex concept that needs to be questioned in the light of an original, unique, atypical and idiosyncratic personal and professional development of a teacher. This book adopted a macro perspective that includes a broad framework—a socio-cultural one, articulating tools, concepts and strategies. In conclusion, professional development is part of human development, and hence needs to be appreciated: the path is not linear, but with tensions, contradictions, theoretical and conceptual fragments to be woven and re-woven together time after time. We hope that the book opens an articulated interest in the multiple possible readings of teacher professional developed.

After this are two schemes of the book. Table 1 presents the main chapter and content; Table 2 presents the concepts proposed for discussion in each chapter.

Table 1 Structure of the chapters

1. Becoming a Teacher	• Teacher professional identity • Between theory and teacher practice • From content to activity: the TPACK model
2. Teacher Professional Development	• Reflective practice • The e-portfolio as a boundary object • The use of the digital video as a reflective tool • Developing research—inquiry attitude
3. Role of the Personal Resources in the Teaching Process	• Activation of self-efficacy • Activation of self-regulated learning • Teacher agency as a dynamic resource • Readiness
4. Role of the Tools and ICT in the Teaching Process	• Appropriation, tools and scripts • Socio-materiality in the teaching process
5. Role of Collaboration in Teaching Process	• Collaboration and knowledge building in the classroom • Collaborative professional learning: teacher-researcher interactions • Collaborative professional learning: role of the social network

(continued)

Table 1 (continued)

6. International and Global Professional Development	• International teacher education • Teacher educators: toward the next generation of teachers
7. Open Perspective: Toward a hyper-teacher	• Sense-making knots of new configurations in classroom • Task: negotiated activity between teacher, students and emergent technology

Table 2 Thematic points in each chapter

Chapter	A theoretical focus	From the research	In the practices	The idea to explore	Professional insight
1. *Becoming a Teacher*	From novice to expert	French teacher-student in classroom	The master thesis	The indirect instructions method	Teacher standard and Epistemic synthesis
2. *Teacher Professional Development*	Boundary object for transformation	Example of ePortfolio structure in a university course	The reflexive methods of self and cross confrontation	Becoming a diffractive practitioner as more-than-reflective practice	Teacher in mobility as a migrant and as allies
3. *Role of the Personal Resources in the Teaching Process*	Typology of agency	Agency after a master program	Contemplative practices in teacher education	Funds of knowledge and fund of identity	The personal teacher's past as professional resources
4. *Role of the Tools and ICT in the Teaching Process*	The artefact in a socio-cultural approach	New social and material appropriation	The case of the iPad	Post-critical curricular theories	Covid-19 and materialised reflection
5. *Role of Collaboration in Teaching Process*	Participative methodologies	Use of social network by teachers in the Global South	Relational agency in working practices	Toward epistemic collaborative communities	To uncover teachers' experiences of knowledge
6. *International and Global Professional Development*	Blended learning	A blended international course for teacher educators	Sustainability of competencies in the indigenous context	Ethical-critical global pedagogy	Conversational professional development
7. *Open Perspective: Toward a hyper-teacher*	Teacher professional development in posthumanism/ Hyper-humanism	Uber Teacher, click education and robot	Teacher in difficult times	Critical and participative meaning-making	The diffractive teacher

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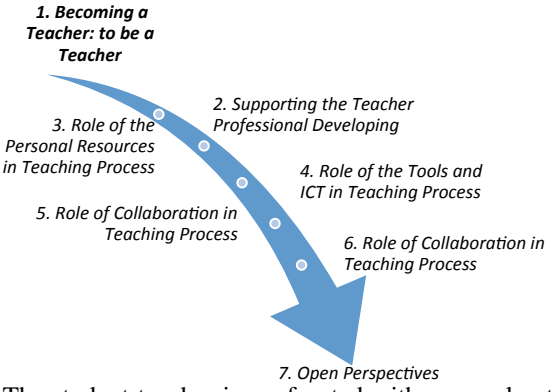
Contents

Chapter 1
Becoming a Teacher: To Be a Teacher

Abstract The student-teacher is confronted with a complex transition during teacher education. In this chapter, we explore the student-teachers' challenges during the teacher education to enter in the institutional role and shape the new professional identity. A research about a teacher-student in French context is discussed, followed by a focus on novice to expert transition. In the end, a brief introduction about the indirect method of instructions, the teacher-student master dissertation's role is discussed concerning the teacher standards toward a personal epistemic synthesis of the teaching experience.

Keywords Transition · Student-teachers · Novice · Expert · Teacher standards



The student-teacher is confronted with a complex transition during teacher education. Simultaneously, the educational system of teacher education faces the main challenge to promote in a short period the passage from theory to teacher practice (Bullough & Gitlin, 2001). In this section, we explore the student-teachers' challenges during teacher education to enter into the institutional role and shape the new professional identity. We have identified two dimensions: the teacher's professional identity and the passage from theory to practice, with a focus on the management of content, activity and technology according to a TPACK model. Then, research about a teacher-student in the French context is discussed, followed by a focus on

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the novice and expert passage. In the end, a brief is introduced about the indirect method of instructions. Simultaneously, the teacher-student master dissertation's role is discussed concerning the teacher standards toward a personal epistemic synthesis of the teaching experience.

1.1 Acquiring a Teacher Professional Identity

Teachers enter in the role with time and shape the new identity gradually. Identity is not something fixed in time. A prominent perspective on identity is the Dialogical Self (DS) Theory (Hermans & Gieser, 2012).

The DS theory was introduced by Hermans (2013) in the wake of American pragmatism and Russian dialogism. He proposed the idea of a flexible self that is composed of multiple positions encompassing different aspects of the Self. An I-position can be considered a "voice". It could be the internal I-position (inner voices of the Self, recognisable most of the time marked by the expression "I am …") or external (voices initially coming from relevant others but incorporated within the unique landscape marked by the term "my …"). I-positions are dynamically relational in the intersection of personal and societal forces through tension. I-positions are also social, in between persons and groups. The notions of uncertainty and discontinuity are useful to describe identity as a fluid feature, always continuously changing, shifting from context to context and from moment to moment. The DS stresses spatial but also temporal transformations (Hermans & Hermans-Konopka, 2010). The DS theory offers the right lens through which to understand how individuals interpret and make sense of such interconnections between identity and situations.

Teacher professional identity (TPI) is a complex and multi-core concept, consisting of several factors intertwined, such as the conceptions and expectations of others, social image, practical experience and personal background. Identity is formed by engaging with others, shaped by the context, the experience in the field and the biographical teaching profile. Beijaard et al. (2000) describe the identity of teachers as being composed of three sub-identities:

- pedagogical expertise;
- subject matter expertise;
- and educational expertise.

Recently TPI has been conceptualised as a continuous and dynamic process of sense-making and reinterpretation of values and experiences, at the same time unitary and multiple, continuous and discontinuous, individual and social.

Cultivating a sense of who we are—and are becoming—is a continuous interpretation process that does not have a stable character but is complex and shaped by personal and contextual factors. Being a professional involves more than understanding concepts and developing skills. It involves personal transformation: learners begin to construct a professional identity within educational contexts. Supporting

learners to take up professional identities is thus a critical but under-interrogated role played by tertiary institutions.

Simultaneously, during the teacher education, the students are involved in different stages and experiences in the classroom, more or less in complete autonomy and responsibility of the classroom. The growing process of teachers is embedded in challenges. As recognised in educational literature, student-teachers mainly struggle to integrate knowledge into the practical context of a classroom (Blomberg et al., 2011), finding it difficult to pay attention to critical elements of classroom instruction and to deal with the complexity of classroom interactions. For this, in the next section, we focus on the circular dynamic between theory to teacher practice.

1.2 Circular Dynamic Between Theory to Teacher Practice

We consider that central to shaping teacher professional identity for a student-teacher links theory and practice, a central issue for teacher education (Falkenberg et al., 2014). Initial teacher education proposes integrating theory and practice in practical experience during field experience that could make visible the invisibility of learning (Mitton-Kukner & Murray Orr, 2014). During the first experiences in the classroom, teacher-students have the opportunity to confront themselves with practical questions and problems. In this way, the first teaching experiences help to connect education and professional settings.

Student-teachers can successfully link pedagogical knowledge to classroom practice if they acquire the ability to shift from theory to practice but also develop the attitude to apply critical reflection on their practice. Teachers' education is a process 'in progress' that involves the interpretation and reinterpretation of experiences (Kerby, 1991) through a process of reflection that activates the cognitive and emotional resources. Therefore, the review should be continuously supported, as a personal assessment and as a step to continuing education.

Teacher education could play a transitional role in supporting the TPI and the passage from theory to practice considering the structure, the curriculum and the immersive social experiences with other peers and teachers. Participation in a learning community leads to the acquisition of new rules, roles, practices, and processes, which leads to becoming a professional and affects identity (Brown & Campione, 1990). In a community of practice (CoP) (Wenger, 1998), the concept of learning is as a process related to participation in contextualised practices, influencing and interacting dynamically with the methods of identity construction. Indeed, the learning process allows the construction of new meaning and decision making for teacher identity.

The student's entry to a teacher professionality can be conceptualised as a gradual process of integration into the teacher community, which we analyse with the framework of the legitimate peripheral participation model. The Legitimate Peripheral Participation model (Lave & Wenger, 1991), explains how it is possible to move

from peripheral participation to more central participation for a neophyte who gradually learns to participate in community practices. The model considers the knowledge acquisition as progression participation, from the periphery to the community's centre. In particular, Wenger (1998) distinguishes four forms of participation:

- two are more distinct as full participation (consists of the active involvement of the participant) and full non-participation (consists of not being part of a community and therefore in exclusion from it);
- and two see peripheric and marginality represent more subtle forms of non-participation. On the periphery, non-participation is understood as limited participation and constitutes a progressive opportunity for learning; marginality, on the other hand, prevents full participation and could lead to non-belonging as isolation.

As newcomers, the student teachers move from the position of a general student to full participation as a teacher. This progress process of expertise is intended as a gradual trajectory, conditioned by the situation's nature. The novice in this process has the chance to experience access to local resources, developing relational and procedural skills (Brown & Duguid, 1991).

Joining into the Community of Practice is particularly useful when the participants have full access to different parts of the practices; there is sufficient horizontal interaction among participants and when the resources, technologies and structures are transparent and available.

Interaction with experts helps the newcomer 'see' the social-mediated reality, encouraging the understanding and the coordination of tasks.

The practical experience established a bond of reciprocity between professionalism and education. The experience of the stage in teacher education is the moment of crossing the boundary between the educational and professional system. Indeed, the internship creates a pattern that connects (Fig. 1.1): the educational and professional contexts are intermingled and mutually beneficial, allowing the student teacher to experiment competently in a context that creates meaning.

Therefore, the stage requires specific skills and is dependent on the resources and constraints of the contexts of use. However, the skills acquired directly in specific contexts show low generalisation ability and will meet unexpected changes or difficulties if no theoretical support is offered or made available. For this, the practical experience must be done in continuity with the academic education, helping

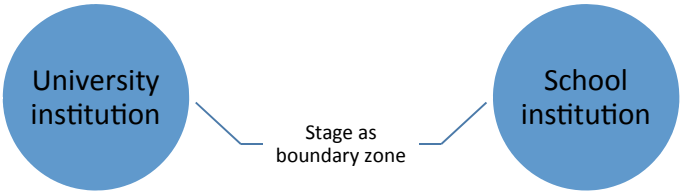

Fig. 1.1 Stage as a boundary zone

the student teachers to adapt to the unpredictability and changes of the transition process. Therefore, it is crucial that the advantage of experience, through simulated environments and social interactions specially created, smooths this transition. In this process, the exchange of the novice with the expert becomes central. The cognitive characteristics of an expert (Scribner, 1984) are the definition of the problems, flexible solutions, integration of the context in the problem-solution system, optimisation of effort as a strategy and dependence on specific knowledge. The expert develops the 'know-how', especially in uncertainty and transformation situations, putting together reflection and action. Thus, there emerges a multidimensional and hybrid view of expertise (Tuomi-Grohn et al., 2003).

1.3 From the Content to the Activity

This section focuses on a model widely spread in the literature and at the same time also widely discussed.

Mishra and Koehler (2006) theorised the TPACK model by adding a third dimension (Technological Knowledge: TK) to the Shulman's model (1987) which was based on two dimensions (Pedagogical Knowledge: PK; and Content Knowledge: CK). Three fundamental dimensions (TK, PK and CK) and the interactions between them compose the model:

- TCK (Technological Content Knowledge);
- TPK (Technological Pedagogical Knowledge);
- PCK (Pedagogical Content Knowledge) and TPCK (Technological Pedagogical Content Knowledge).

This theoretical framework emerged from many empirical works and practical applications.

However, very few of them investigated the national and cultural context as a possible factor dependent on the TPACK. The study of Castera et al. (2019) highlighted the significance of the model in cross-national research contexts. This study is interesting because many researchers investigated TPACK in separate national contexts and rarely from a cross-national perspective.

More research on the international application of TPACK helps to evaluate the value of the model, and it could become a tool also in the hands of the teachers. Indeed, they can check the combination of the three main dimensions in their practices. As a "diagnostic" tool, the teachers can change, re-think and re-frame their activity.

A Theoretical Focus: From Expert to Novice The novice's entry into a "community of practices" is referred to as "*Legitimate Peripheral Participation*" by Lave and Wenger (1991). In this perspective, the beginner (defined with the term newcomer in international literature) moves from a peripheral

position to a central one, gradually modifying their participating ways. This path is intended as a gradual trajectory, conditioned by the specificity of the situation, which can hardly be established and predetermined a priori. The transition from the external and peripheral position to the central part allows the individual member to become expert in the specific practice of the community and therefore to become a useful member.

During the process, the novice has access to local resources, developing increasingly specific relational and procedural skills: abstract and decontextualised notions, work practices, social roles and appropriate and strategic communication behaviours typical of the organisational context into which it is inserted.

According to Lave and Wenger, learning how to participate in a community of practice is particularly useful when:

a. participants have full access to different parts of the activity and proceed over time towards broad participation in the central tasks;
b. there is sufficient horizontal interaction between the participants, mostly mediated by stories of critical situations and their solutions;
c. the technologies and structures are transparent; that is, their functioning is available and recurrent.

Hutchins (1995) speaks of an "observation horizon". The concept underlines the novice's perspective to participate in activities through different channels, such as written and verbal instructions, imitation or simple exposure to the behaviour of others and active sharing working practices, interpretative models and community customs and organisational rituals.

As Wenger (1998) points out, "when newcomers enter the community, generational discontinuities propagate and expand within them; relationships change in a cascade process" (p. 107): the members already inserted become old and the newcomers are helped to integrate. Even non-expert colleagues play an essential role in the insertion of the new member, motivating comparison and mutual exchange: the socialisation of knowledge allows the construction and sharing of solutions, the acquisition and use of specific terminology, mutual support and the exchange of suggestions and ideas.

The analyses conducted by Goodwin (1994) on the participation of newcomers in the expert practices of different types of communities are located in this direction. The author performs an exciting study on the analysis of learning the "professional vision" of an archaeologist apprentice. During the discursive negotiation that takes place continuously in the operational phases of the excavation, the expert archaeologist helps the apprentice to "see" the difference between the "cultural" material compared to the "natural" material present in the debris. This discrimination occurs through an articulated visual, gestural and verbal interaction between the two archaeologists of different competence.

Goodwin (1994) notes three strategies used to encourage learning professional practice:

– The coding schemes: consists of external stimuli organised into categories and events relevant for professional work. Through this process, it is possible to organise and facilitate the learning process, circumscribing and delimiting what needs to be examined.
– The highlights: makes what is deemed relevant for the specific activity visible to others.
– The graphic representations: detects and organises the collection of a wide range of aspects in a single model, such as graphics, photographs and inscriptions.

The centrality of the newcomer's learning path in community practices allows us to understand how knowledge and innovations circulate within the community. It could help the whole educational institution better organise the integration and adaptation stage of the teacher and the development of the community of teachers.

1.3.1 From the Research*: French Teacher-Student in Classroom*

In this section, research in the French context is proposed. At the end of the obligatory middle school, students can choose between the vocational high school, for professional and technical learning, or humanistic and technological high school. It takes two years to prepare for The Professional Skills Certificates, called CAP, and three years for the Bachelor Professionals, called Bac Pro. These qualifications attest to the acquisition of knowledge and skills in an industrial or tertiary professional field.

To teach in high schools, teachers must hold a master degree called "*Métiers de l'enseignement, de l'éducation et de la formation*" (MEEF) provided by their university, and pass a national examination. In this way, the teacher gains the so-called '*Le Certificat d'aptitude au professor at de lycée professionnel*' to be able to teach. Since the 2013 academic year, the Higher Schools of Teaching and Education have provided initial teacher education. French teacher education has a long theoretical and vocational tradition.

The current structure of teacher education aims to achieve a double objective:

- complete the process of 'universalisation' of initial teacher education (undertaken by the reform of 2009);
- establish an integrative approach between theory and practice during the master programmes.

The student teachers can gradually enter into the profession. In the first year, teacher students follow a primary pedagogical and disciplinary curriculum. In the second year, the teacher-students admitted to the national evaluation, have the status of 'official trainees' and can undertake practical experience in a school, corresponding to the equivalent of part-time teaching service. The stage enables students to acquire knowledge and build the skills necessary to become a professional teacher. At the same time, they gain the ability to do their job by applying traditional methods and approaches and designing appropriate education schemes for each student, taking into consideration any difficulties related to students' social status. The aim is to reach a common foundation of knowledge and skills for all student teachers, making them capable of acquiring a professional qualification.

As in different countries, teacher education in France is always in evolution due to political reforms. For example, teacher education is organised as follows – a situation that it will evolve in the future:

- In the first year of the master's course (M1), the practical experience consists of activities of observation, aimed at the construction of the teaching early skills. The teacher students have to: (a) actively participate in teaching sequences, considering the respective subject area and grade level; and (b) assess the effectiveness of choices. The goals are achieved with strict collaboration between the teacher education teaching staff and the guided scholastic supervision.
- In the second year of the master's course (M2), the practical experience allows each teacher-student to work in the teaching profession under appropriate monitoring and scaffolding supervision. The student-teacher participates in all activities concerning the life of a school, in terms of teaching (preparing lessons, teaching lessons, assessment, etc.), academic support (participation in academic life) and institutional involvement (involvement in the school project, relationship with stakeholders, etc.).

In the following section is an example of a student-teacher's learning trajectory during the practical experience (for more details, see the two full papers of Cheneval-Armand & Impedovo, 2016; Impedovo & Cheneval-Armand, 2016). To understand the student-teacher's learning trajectories, we observed and analysed three video sessions. The first video recorded the student-teacher in a real classroom at a vocational high school in Electronics, Energy and Communicating (ELEEC). Twelve boy students attended the lesson, with an average age of 17, enrolled in the last year of vocational high school. The second video recorded a meeting between the student-teacher and the university trainer, while the third video shows a meeting with the senior teacher. The videos and field notes were collected and qualitatively analysed by two researchers. This analysis gives an account of the learning trajectory of the student-teacher toward her teacher professional development.

The research presented here concentrates on the comparison of three sessions (see Table 1.1), in which the focus is on the teacher-student, first in the classroom and then in discussion with the trainer and the teacher. From the qualitative data collected, we have identified eight indicators grouped into three dimensions in the three sessions:

Table 1.1 Dimensions and indicators of the process of a learning trajectory for the student-teacher (Impedovo & Cheneval-Armand, 2016)

Dimension	Indicators
Pedagogical expertise	Object-oriented activity Questions Individualised support
Educational expertise	Rules Responsibility for student's learning Meaning of learning
Subject matter expertise	Situated learning Correct content

a. Pedagogical expertise;
b. Educational expertise;
c. Subject matter expertise.

The analysis of the three dimensions reflects those identified by Beijaard et al. (2004).

In the first session, it emerges a vision of a teacher who plays a very central role in conducting activities, trying to keep control through the use of artefacts and a highly structured task. During the lesson, the student-teacher tried pedagogical and teaching strategies, such as scaffolding. The techniques repertoire is enriched in the session, but the user remains highly circumscribed and contradictions (Fig. 1.2).

The comparison between the expertise and the novice takes place during the two sessions. With the university, the trainer emerges from the educational dimension, while the teacher focuses on the content, with the need to deeply anchor it in the context. Both the experts in their discussions focus directly on trainee's omissions or trainee's non-appropriate choices. We can identify an acceptance attitude by

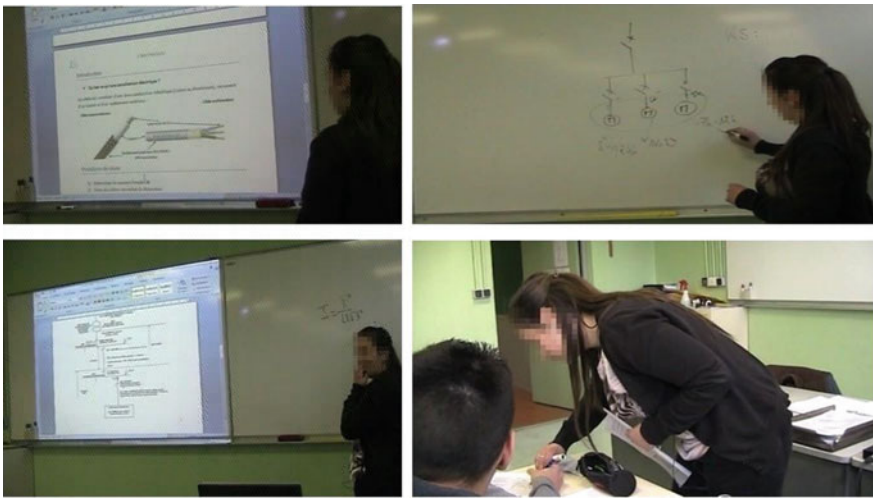

Fig. 1.2 The teacher-students in her first lesson (photos by the author, published in Impedovo & Cheneval-Armand, 2016)

the senior teacher (probably for the preview relationship as supervisor) and formal and distant communication by the university tutor, due likely to the "academic" institutional role. From the teacher-student answers during these confrontations, we can trace forms of resistance to change but also a progressive awareness. Expertise finds flexible and contextualised solutions, optimising effort and specific knowledge (Scribner, 1984).

For this reason, we believe that a real practice for student teachers during teacher education is a crucial moment to gradually entering the teacher community. It can particularly be useful if supported by reflection shared with an experienced educator aimed at finding new meaning and alternative scenarios. This support should also provide positive and constructive feedback, taking into consideration also the emotional side of the role of counselling. Indeed, expertise is a tricky quality to achieve. Still, the right support with a positive attitude by peers affects the development of teacher professional identity (Akkerman & Meijer, 2011) and professional development. Observing how this happens provides useful guidance for structuring targeted interventions to improve student teachers' development. The articulation of teaching for the acquisition of knowledge, the building of competence, and the balance between the different experiences are vital issues in professional development.

1.3.2 In Practice: The Teacher-Student Master Dissertation

In France, the teacher education curriculum condenses different discussions about the link between professionality and theoretical knowledge. It is proposed to articulate scientific and pedagogical professional knowledge; the practice of the profession but also the integration of educational research.

Fabre and Lang (2000) distinguish three constitutive tensions about the thesis in the teacher-education master: (a) the adhesion to the paradigm of the apprentice researcher or to that of the reflective practitioner; the tension between the research report and the trace of an adventure of awareness; the tension between a personal trajectory and professional socialisation. The writing process testifies in different ways to a path of identity development, strengthened by research and reflection on the professional practice in question. The dissertation becomes such a new genre (Crinon et al., 2005), which testifies the teacher figure's complexity, from theory to action. Proposed also as a collaborative activity, the writing group process let the articulation of a joint reflection. Here are some extracts by French teacher-students about the online and in-person articulation of the collaborative writing process experienced during the dissertation:

Extract 1:

The face to face discussion in the group helps the development of a general understanding of what is required to advance. Online, except for the work done to meet the deadlines, the time can be badly exploited or the work postponed until the last minute.

Extract 2:

When developing the research question, the hypothesis and the design of the data collection it is, I think, essential to be face-to-face in a group to be able to really bring out all the ideas and discuss freely. For the drafting and analysis of the results, remote work is largely feasible insofar as the group communicates easily with interfaces like Microsoft Teams where all the work is shared and automatically updated.

1.3.3 The Idea to Explore*: The Indirect Method of Instructions*

The indirect method of instructions is a modality to collect data which was used in the 1970s in car production. The work psychologist Ivar Oddone designed this analysis device. It consists of an explanation process of one's own work modality to another one interlocutor, called the "double". The instruction is so formulated: "Let us imagine that I am similar to you. Tomorrow I have to replace you at your workstation: tell me now what I have to do so that no one notices the substitution". The working modalities are so shared, and the interlocutor has all the instructions to act in replacement. The activity is performed in front of a group of peers. The process is aimed to show the folds of habits, and automated gestures condense in action. The focus is on the story to be performed by the interlocutor, so it must be straightforward and easy to understand. This method was adopted by Clot to be deployed in many formative situations. This device turns out to be a real experience of the visibility of everyday work. Kloetzer (2015) applied this method in the analysis of the tutoring learning process, showing the importance for the tutor to know how to analyse their own activity but even more to learn to analyse the apprentice's activity.

1.3.4 Professional Insight: *Teacher Standards and Epistemic Synthesis*

In a hyper-connected world, initial and continuous teacher education proposed by higher institutions remains generally limited to national borders. More, an increasing number of professional standards describing competencies for teaching staff have appeared in different states around the world. For example, there is in Australia the National Framework for Professional Standards for Teaching 2003; in England the Training and Development Agency for Schools 2007 and in the USA the National Board for Professional Teaching Standards 2001. As discussed by Goodwin (2020), the globalisation and its pervasive neoliberal ideologies have contributed to the rise of teacher "standards", a crystallisation of cultural, political and social perspectives in a sort of "tick-box professionalism" (Goepel 2012, p. 489).

The idea of accessible tools for easy identification of teachers' skills is highly seductive for the evaluation system. At the same time, the teacher professionalism brings internal contradictions: for example, democratic versus managerial professionalism (Whitty, 2008); individual versus institutional (Wermke & Höstfält, 2014); external versus internal accountability (Fullan et al., 2015). Labaree (2003) claims that teacher culture is characterised as practicality oriented, limited to normative thinking and anti-intellectual rather than trained to be an inquirer or a free thinker. Choi (2020) shows a personal confrontation with the anti-intellectual mindset, as most teachers stay in their comfort zone and resistant against complex higher-order thinking.

An example is seen in Table 1.2 with the French Educational Minister teacher standard (2013). The French reference is organised in "Shared competences to all teachers and education staff" with 14 skills. Each competence is detailed with a description and two operational sets of indications.

Table 1.2 French standards (translation by original French official public version online)

Shared competences of all teachers and education staff	Competencies common to all teachers
1. Share the values of the Republic 2. Include its action within the framework of the fundamental principles of the education system and within the regulatory framework of the school 3. Teachers and education staff, pedagogues and educators at the service of the success of all students 4. Know the students and the learning processes 5. Take into account the diversity of students 6. Support students in their training path 7. Act as a responsible educator and according to ethical principles 8. Master the French language for communication purposes 9. Use a modern foreign language in the situations required by his profession 10. Integrate the elements of digital culture necessary for the exercise of his profession 11. Cooperate within a team 12. Contribute to the action of the educational community 13. Cooperate with the parents of students. Cooperate with school partners 14. Engage in an individual and collective process of professional development	1. Master the disciplinary knowledge and their didactics 2. Master the French language as part of its teaching 3. Build, implement and animate teaching and learning situations taking into account the diversity of students 4. Organize and ensure a group operating model that promotes learning and socialization of students 5. Evaluate the progress and the acquisitions of the pupils

Another recent example of a teacher's standard is the Bhutan Professional Standards for Teachers (BPST). It categorises teachers into four career stages – beginning, proficient, accomplished and distinguished. Teachers' base salary compensation will reflect their categorisation, and not anymore only the compensation based on seniority. The categorisation would be found on the seven standards, which are further divided into 37 focus areas. The seven criteria include the diversity of learners, learning environment, content knowledge and pedagogy, planning and teaching, assessment and reporting, personal growth and professional development, and professional engagement and Bhutanese values.

The analysis of teacher standards can give information about the teachers' representation and the features attributed to it. An example of research is done by Goodwin (2020) on US, Australian and Hong Kong teacher standards to find teacher representation and influence of globalisation.

In another study, Ceulemans et al. (2012) reports on a pilot study that applies a socio-technological 'lens' to examine this standardisation process in Flanders' educational policy. As they propose from the analysis:

> The reshaping of the list of competencies, and the accompanying processes of identification and differentiation by teacher training programmes, then, are not signs of failed standardisation but signal that the core competencies actually start to 'work' as standards. As in Latour's (1987) 'immutable mobiles', the core competencies themselves do not change, as they are defined in the Decree. Rather, they are mobile; they are taken on in many forms, e.g. across different training programmes, by different teachers, and in different teaching contexts. (p. 43)

To keep open a dialectic reflection on references standards, it means to start a genuine negotiation on teacher education and the teacher role with all the tensions, contradictions and ambiguities embedded. The multiple inconsistencies in teacher education and the teacher role have to be addressed in a personal and collective professional epistemic synthesis.

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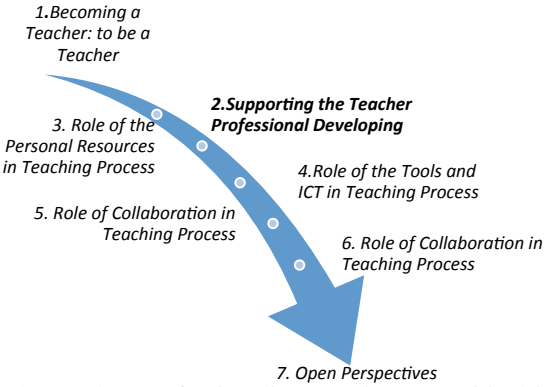
Chapter 2
Supporting Teacher Professional Development

Abstract In-service teachers need to continuously update their role and keep up with society's constant evolution. In this chapter, the reflective practices are discussed, declinate in the tool of the e-portfolio—with a practical example in a blended course-, the digital video and the research-inquiry attitude. The reflexive tools could work as a boundary object and mobilised with a self and cross confrontation methodology. The concept of diffractive practitioner and the discussion about the teacher as an immigrant and as an ally is open to deal with new rapid societal changes.

Keywords Reflective practices · Blended learning · Digital video · Research-inquiry attitude · Diffractive practitioner



The teacher professionality constitutes a critical issue, considering the modelling role in assuring innovation in the classroom. Like many other works, professional development supports increased specialisation, new forms of organisation and the agile transformation of work outputs (Littlejohn & Hood, 2017). New challenges are also open for teachers' professional learning due to rapid societal changes and the spread of technology (Ludvigsen et al., 2010).

In this changing context, according to the three-stage model of professional learning outlined by Simons and Ruijters (2014), teachers and teacher-educators have to:

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1. elaborate work-competencies theoretically and in practice;
2. expand theoretical knowledge and insights by learning explicitly from and through research;
3. externalise practical and theoretical insights, which means contributing to the development of the profession and organisational learning.

The reflective practice "plays an important role in experiential learning, both cognitively and metacognitively. It has been widely discussed in the literature as an important approach for promoting learning and higher-order thinking skills, developing professional practices, and facilitating and structuring learning through experiences" (Looi & Wu, 2015, p. 610).

In this chapter, reflective practices are discussed. Some reflective tools are discussed like the e-portfolio—with a practical example in a blended course—the digital video and the research-inquiry attitude. The reflexive tools could work as a boundary object, to question with the methodology of the self and cross-confrontation. The concept of diffractive practitioner and the discussion about the teacher as an immigrant and as an ally is open to deal with new rapid societal changes.

2.1 Reflective Practice

The development of reflective thinking is increasingly proposed in curriculum and activity during teacher education. The process of self-reflection increases skills, promoting professional learning, facing changing professional contexts (Alsup, 2005) and facilitating the creation of alternative scenarios (Korthagen & Vasalos, 2005). The formation of the teaching profession involves the interpretation and reinterpretation of experience. A reflective approach to practice helps identify the strengths and weaknesses of teaching practice and improving upon it (Impedovo & Khatoon, 2016). According to Vloet (2009), these reflective processes have to occur before, during and after professional actions. Reflection has an impact on a teacher's professional identity.

Reflective practice is a central topic in the literature for teacher professional development (Avalos, 2011): it is considered an ability for continual self-renewal, while also comprising a critical inquiry, examination of beliefs and assumptions. Teachers can identify weaknesses and strengths and improve their practice (Ahmed & Al-Khalili, 2013).

The educational system should promote reflective practice in a systematic and organised way. For example, to help student-teachers understand how practice fits the theory, it could be interesting to discuss the impact of student-teachers' reflections on their classroom discourse. In this case, the interaction of the novice with the expert is of great importance. In a subjectivity and objectivity dialectic tension, "teachers' actions are where the subjective sense-making and the objective reality truly interact, and therefore, teachers' reflections-in-practice seems to be what genuinely leads to teacher expertise development" (Inoue, 2016, p. 20).

Dewey (1933) considered that reflective activity occurs when a person faces a perplexing, troubling or confusing situations. Hatton and Smith (1995) consider three dimensions of reflection: (a) for-action involves the teacher reflecting proactively about teaching before or while preparing for practice; (b) in-action involves the teacher reflecting during their practice; (c) on-action as successes and failures of teacher past practice.

Teachers can evaluate and re-evaluate their teaching experiences to open new action: teachers making sense of past experiences to project into future new practices. So, the deliberative processes have to be made with openness and responsiveness to external situations and involve personal feeling (Vloet, 2009).

Reflective practices should be supported by scholastic institutions, as is already the case during teacher education. It should be supported by collaborative practices, professional dialogue and useful tools for the continuing development of knowledge and practice.

Reflection should be promoted by teacher education, as joint responsibility by the institutions and the personal account. Reflection could be a prompt for professional learning to develop the expertise of the teacher, helping in the introducing of innovations (Impedovo, 2016). Indeed, a meta-analysis of the strength and difficulties of one context could help to understand how to transform it and introduce change. The reflection could open space for creative thinking and suggest and accept new prospectives, experiencing new behaviour, as shown with this anecdotic little story:

> A man visited Gandhi with his son, complaining that he ate too much sugar. The man asked for advice. Gandhi thought about it for a moment and then said: "Go away and come back in three days". The man did as he was told, and be returned after three days. At this point, Gandhi replied to the boy "You have to stop eating so much sugar. The boy's father, who was disoriented, said: "Why did it take him three days to say this?". Gandhi replied: "First, I have to be the one to stop eating sugar."

In the following sections, we analyse three devices supporting the reflexive process: the e-portfolio, digital video and research-attitude.

2.2 The E-Portfolio as a Boundary Object

The use of ePortfolios as an assessment device is widespread in preservice teacher education, due to its potential in support and reflection on professional practice (Impedovo et al., 2013).

The relevance of portfolios has been discussed widely in education, including work-based learning and the school (Attwell, 2007, p. 40). The reference to an organised collection of documents produced by students is a recurrent, if not universal, a feature of definitions of the portfolio in the literature. The portfolio's aim could be different, as an assessment of professional skills and documenting, evaluating, or presenting personal works. The digital version of the portfolio proposes an enrichment and novel contexts of implementation. Eportfolios as a collection of artefacts

is produced either individually or collectively using various formats (e.g., video, graphics, or text). The digital version has the advantage of greater flexibility, making it widely used, allowing the expression of talent, creativity and individuality, and their technological capacity.

The so-called "folio thinking" is a term coined by Chen (2004) to indicate the mental habit of building connections among experiences, skills and artefacts and making these connections visible to readers and the same authors of the ePortfolio. Student teachers occupy a central position because, by creating ePortfolios, they are encouraged to take responsibility for their learning. Thanks to the features made possible in storing the reflective tracks, the teacher can monitor, direct and guide the learning process, supporting an assessment process (Barrett, 2001).

EPortfolios can be a tool for self-assessment, self-regulation, critical skills, and active participation in students' hands. Particularly central is the area of students' metacognitive process.

The ePortfolios play a role also in identity development. Impedovo et al. (2018) show how ePortfolios can facilitate epistemological learning and identity transformation as a student's transition from learner to professional through student-student and student-teacher interaction.

Sociocultural perspectives conceive ePortfolios as artefacts with a specific function in the learning process: specifically, transacting towards professional contexts. Such a stance views ePortfolios as a "boundary object", enabling people and systems to construct shared thought and action (Impedovo & Manuti, 2016).

Boundary objects have several characteristics that are, in our opinion, also reflected in ePortfolios:

- *Modularity*: ePortfolios can be structured into several topics or folders, spread throughout the course.
- *Complexity*: While ePortfolios have a concrete and material dimension, they are also closely aligned with more abstract cognitive processes, such as assessment.
- *Adaptability to different purposes and genres*: the ePortfolios stimulate students' reflection and support formative and summative teacher evaluation.

Thus, ePortfolios can be understood as an artefact capable of supporting dialogue between teachers and students and between university and professional contexts. Supported by teachers and tutors, students express their reflections and reasoning in ePortfolios. This process valorises the role of the teacher in meaningful feedback and assessment. It makes visible not only what students learn but also how they learn and open up ways of understanding students' sense of who they are as learners and as future professionals and citizens.

2.3 The Use of the Digital Video as a Reflective Tool

Video-aided reflection can influence teachers' ability to change teaching practices.

This trend finds its antecedent in microteaching. This technique originated in the 1960s at Stanford University, to train people in specific skills, following a modelling approach. The microteaching method lost popularity because it was too detailed and did not consider the complexity of interactions between teachers and pupils in the classroom setting (Santagata, 2010). In general, there is a tendency today towards a more holistic and integrated approach, articulated at different levels of reflexivity. It is especially useful for increasing pre-service and novice teachers' ability to relate their university learning to their classroom practice and bridge the gap between theory and practice.

Observing a classroom video can help pre-service teachers relate their university learning to their classroom methods, bridging the theory and practice gap (Abell & Cennamo, 2004). Video has been integrated into the context of the professional education of practising teachers. Some studies have examined pre-service teacher education using video-based approaches, usually focused on group settings.

Video helps instructors assess their teaching's strengths and weaknesses, noticing or calling out what is relevant in a classroom situation. There is great interest in the process of reflection and sharing the video in the teaching community. There is ongoing discussion regarding the efficacy of watching videos of one's teaching versus others' education. Personal relevance in a video is perceived to play an essential role in in-depth analysis and can increase awareness in the reflection process (Snoeyink, 2010). The opportunity to review teaching methods with tutors or experts' support is an essential condition for the development of teaching expertise. However, video is not useful in itself and needs to be scaffolded. Video gives the possibility of providing complex assistance to reflective activity, more than only, for example, the feedback from a trusted colleague. The use of video recording concerning the critical peer or trainer feedback allows a more reliable technique, avoiding distortions relating to taking notes, inaccurate reporting, and accurate gestural activity (Mollo & Falzon, 2004). However, as considered before, video is not useful in itself; it must be embedded in an appropriate instructional context and with adequate scaffolding to capitalise on what video analysing offers.

The peer revision of video is impressive for a collective reflection and through a collective confrontation, supporting practices spreading within the teaching community. We can consider that targeted education reflections supported by video recordings could help teachers improve classroom management, identify relevant situations, and engage in knowledge-based reasoning, professional learning, and video annotation (Perini et al., 2019). The use of the video is a central tool in the methodology of self-confrontation, described below.

2.4 Developing Research—Inquiry Attitude

We consider the development of research attitude and skills during a teaching course can improve and affect reflective processes. The process of becoming a teacher-researcher

> challenges teachers' core beliefs and values about themselves and the work they do, it forces them to confront who they are as teachers and who they want to be as professionals. (Girod & Pardales, 2001, p. 3)

The teacher can develop new skills and pedagogies with engagement and collaboration into the research. The new skills could be critically applied in the classroom, in a tentative of experimentation, exploration and curious approach to the dynamic of learning. Adopting an inquiry-research attitude mobilises new skills, demands explicit teachers' efforts and commitment, and asks teachers for a unique engagement in challenging traditional practices. This perspective is in line with a reflexive approach (Cochran-Smith, 2005). Following this idea, teachers' perspective as researchers is an exciting point of view, supporting the trend that enacts school reform by sustaining teachers' leadership and autonomy in their works (Girod & Pardales, 2001).

Developing research-based teaching practices is an opportunity for teachers to acquire knowledge and skills to be implemented directly in their approach, improving their decision-making. According to Stremmel and Horm-Wingerd (2007), the goals of including research-based teaching practices in teacher education are to gain insight into teaching and learning and to seek practical solutions to real problems in teachers' professional and community lives. The teacher results to be, at the same time, a reflective teacher and interested in research results and processes.

Current teacher education curricula internationally propose diverse ways of including research in teacher education. The research component could be non-existent, not stated explicitly, or, in other cases, there is an explicit curriculum unit on research methods (Flores, 2017). For example, in France, the integration of research into teacher education is straightforward and required by teacher education's regulatory framework. The literature on the purposes of integrating research in teacher education has existed for about two decades. For example, this literature indicates that the general sense of research integration can be to invite teachers to base their practices on scientific research results, disseminate research knowledge, and improve reflection on teacher practices or adopt a scientific posture approach as researchers (Postholm, 2011). Indeed, including research-based teaching practices in teacher education extends the conventional vision of the teacher as a consumer of other people's knowledge (Girod & Pardales, 2001). This also makes a distinction between research education focused on content and concentrates on the process of doing research.

Individual teachers' capacities of learning research skills as new knowledge are significant sources for professional learning and to incorporate new ways of being (Vågan, 2011), with personal and social transformation. For this, "practitioner-researchers need to be brave" (Swennen, 2018), together with academic researchers,

to introduce more diversity and variety in educational research and discussion. Research is presented about the sustainability of the research inquiry skill after completing a master's course.

A Theoretical Focus: Boundary Object for Transformation For Wenger, participation in a community of practice creates continuity and discontinuity processes between those who participate or do not participate. These discontinuities are detected mainly in the moments of crossing, in which "the passage from one community of practice to another can lead to a real transformation" (1998, p. 121).

Borders become an object of interest inside and towards the outside. In particular, the concept of crossing borders delineates how the two systems meet and "contaminate" each other. Wenger introduces two types of connection between communities: intermediation factors and border objects. The first term refers to people who implement brokering practices capable of introducing elements of practice in other communities. In the perspective of crossing borders, mediators play a significant role because they can propose new features from one community of practice to another. For example, students introduced to an internship can be considered as "mediators" as they bring new tools and insights between the school/university and corporate world.

The object could be artefacts, documents, terms, concepts and other forms of reification around which communities of practices organise their interconnections. The term boundary object was introduced by the sociologist Leigh Star and James R. Griesemer (1989) to describe the objects that serve to bring together the perspectives of different referents for the achievement of a common purpose, as explained in the following quote:

> Boundary objects are objects which are both adapted to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in everyday use and become firmly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds, but their structure is common enough to more than one world to make them recognizable, a means of translation. (idem, p. 393)

The management of these border objects creates coherence and communication between different practices. Indeed, boundary objects can be spaces between communities. Given the above, boundary objects are connectors between other communities, allowing the extension and enrichment of the practices of the community itself. Therefore, the practice, negotiated and developed through the use of boundary objects, is not static; instead, it is a lively practice, always changing, enabling the organisation to evolve and, so, to survive.

In the example reported by Wenger, the standardised forms for the reimbursement of medical examinations in an insurance community are borderline objects because they connect the treatment of reimbursement requests with the

eternal. Boundary objects connect and disconnect; that is, they use forms of reification to connect disjointed forms of participation.

For Wenger, the characteristics that we find in the tools that act as border objects are:

- *Modularity*: for example, a newspaper, which gathers different points of view and addresses other recipients;
- *Abstraction*: like a map that can synthesise and eliminate perspectives that are too specific;
- *Adaptation*: like a building that lends itself to multiple activities (office, home, warehouse);
- *Standardisation*: as a questionnaire, which both the interviewee and the statesman analyse from their perspective.

Border meetings are crucial for the processes of transformation and enrichment of practices, which can respond to different purposes. Wenger identifies several boundary levels:

- the face-to-face conversation between two members which allows both to be transparent;
- visiting a practice offers more extensive exposure to the community of practice and how the members engage with each other—the meetings with a larger participation force a greater immersion, leading to a more intense exchange.

The practice can turn into a connection in three ways:

- *Border practices*: if a border meeting, whether formal as a task force or informal as lunchtime conversations, become habitual and constitutes a constant space of mutual commitment, a new practice is likely to emerge. However, it is collective intermediation that runs the risk of becoming a community of practice in its own right.
- *Overlap*: it does not require a specific border company, but it provides a direct and persistent overlap between two practices.
- *Suburbs*: this is intended as a partially internal and partially external change area. It consists of connecting with other people who are not destined to become full members of the practice. In this way, non-binding and informal access routes are offered (such as observation) without full membership pressure.

2.4.1 From the Research: *Example of ePortfolios Structure in a University Course*

The section describes a model of ePortfolio. It is based on more than a testing course of more than ten years in the University of Bari (for one publication on this, see Impedovo et al. [2013]). It is part of an instructional design offered in blended mode, specifically designed to integrate and combine online and in person learning and teaching.

The course incorporated different teaching and learning methods (individual, in dyads, group work and plenary activities), a range of tasks and a variety of artefacts. The courses were divided into five modules. The relevance of student self-reflection and self-evaluation was foregrounded through continuous updating of individual e-Portfolios, which had a specific structure and clearly defined activities (for the full paper, see Impedovo et al., 2018).

The ePortfolios were structured in the following way:

(a) a personal section, in which students were free to add personal information to share within the learning community;
(b) a quantitative self-assessment section where students could post a self-evaluation form prepared by the teacher and self-updated at the end of each module;
(c) a qualitative self-assessment section where students posted reflections about their own "Zone of Actual Development" (what they think they learned in each module) as well as areas of potential improvement or "Zone of Proximal Development" (their aims and goals for the subsequent module).

During the 2014–2015 academic year, the "friend of the zone proximal development" role (hereafter referred to as "friend of ZPD role") was introduced. This role enhances collaboration within the ePortfolio.

This role is assigned to a peer student selected by each ePortfolio author. The selected peer's role is to help monitor the ePortfolio and provide feedback for improvement, particularly in the section that explores the author student's ZPD (Vygotsky, 1986). Each participant chooses her or his own "friend of ZPD" without any constraint of reciprocity. The "friend of ZPD" expresses personal opinions in a purpose-built web forum, offering comments, tips and advice to improve their partner's skills, as well as supporting goal setting for the next module.

Impedovo et al. (2018) consider that through the "friend of ZPD" role, the ePortfolio supports a dialogic space where students can discover how learning involves identity transformation—from learner to professional. The "friend of ZPD" role creates a dialogic space for peer interaction and immediate feedback by cultivating a shared sense of orientation toward the work. The peer interactions weave together knowledge, skills and identities as the students take up various identity-positions, concerning their imagined, possible future selves as professionals.

The instructional design could become a meta-tool to let the student deal with challenges and complexities during the learning process, oriented to manage complexity—an essential skill in contemporary society.

2.4.2 *In Practice:* The Reflexive Methods of Self and Cross Confrontation

The self-confrontation (for more references, see the works of Mollo & Falzon, 2004) consists in presenting to the people observed the most numerous possible traces of their behaviour and asking them to comment on them. The method has two stages, recordings of the activity and then confrontation during subsequent interviews. Self-confrontation can also be used for education purposes.

The origin and theories underlying self-confrontation methods indicate their belonging to the field of clinical psychology. These methods seem to be able to be mobilised and adapted in different methodological and epistemic approaches. For the research aims, the opportunity to analyse teacher reflections is a valuable opportunity that can provide useful information in describing the process of professional learning. The research supports the use of video in teacher education as a tool for reflection, capable of opening new perspectives to support self-analysis.

Teachers had the opportunity to concentrate intensely on the observation of their activity. The teacher reviews the lesson recorded together with the researcher, deciding where to interrupt and to make a comment. During the watching of their own video, the teacher becomes progressively more aware of the nature of the activity performed in the classroom. The video externalises the implicit perspective and gives a voice to hidden knowledge. At the same time, the researcher proposes some questions to stimulate reflection. The researcher, encouraging explanation during the interview, helps the teacher carry out the video analysis with reformulation and supportive communication. In this way, a progress report is done about the lesson recorded. The video works not only as a recall but also as a rebuilding of the activity (Mollo & Falzon, 2004), forcing a better understanding of the action in a comprehensive perspective and a higher level of explanation.

Similar to the self-confrontation, the "cross-confrontation" opens the dialogue to a group of professionals more broadly. It uses the discussion to transform their professionality in a collaborative and secure atmosphere. The method is based on three stages (Kloetzer & Henry, 2010):

- First, the researcher performs an observation in situ of the activity based on a collective of volunteer professionals and the specific action to focus on;
- Second, commentary of the recorded video;
- Third, collective restitution of the analysis done. The activity analysis is no longer done just by the researcher and the direct protagonist, but by the peer, opening the perspectives.

In both practices, narratives play a decisive role in shaping early-career teachers' understanding of teaching practice, like the central role of receiving feedback informing professional knowledge and identity in initial teacher education. The acquisition of research skills can bring development and enrichment of teacher professional identity and intuitive skills. In the following section, we explore the last device: the research inquiry attitude.

2.4.3 *The Idea in Brief:* Becoming a Diffractive Practitioner as More-Than-Reflective Practice

The reflection is the main topic in teacher professional development literature. An interesting perspective is added to this, which is proposed with the metaphor of the physical phenomena of diffraction.

The term diffraction comes from the Latin verb "*diffringere*", which means to break apart. The diamond with different light is a common image of the phenomenon. Donna Haraway (1997) articulated how "inference patterns can make a difference in how meanings are made and lived" (p. 14).

According to Hill (2017)

> diffractive methods, therefore, illuminate the fluid and ever-evolving process of world-making in which phenomena are constituted through their material entanglements. In contrast, reflective methods produce static representations of a reality that is assumed to be pre-existing and stable. (p. 3)

This concept shifts the gaze from individuals to human and to the more-than-human entanglements: "join with [things] in the material flows and movements contributing to their – and our – ongoing formation" (Ingold, 2011, p. 88). From a postmodern perspective, the diffractive concept shows the relationship and entanglement within and among human bodies and materiality like artefacts. It stresses more becoming the process of becoming and continue change of the social and material configuration.

2.4.4 *Professional Insights:* Teacher in Mobility as an Immigrant and as an Allies

Teachers globally are confronted with the question of immigration. The condition of migration is experienced first-hand. For example, in France, early-career teachers are usually moved more or less far from their original residential department, provoking stress, family issues, and significant daily life changes. The change is proposed at the national level to fill the scarcity of teachers in some French peripheral or problematic areas (for geographical, economic, social reasons). The early-career teacher accepts mobility as an "incognita" condition that compensates for the social and economic advantages, such as the work's security and stability. The mobility procedure also

guarantees a rewarding address to more senior teachers, expressing their school preference where to move and work.

On the other side, there is the teacher's engagement first-hand with students' immigration and multi and interculturalism. This question touches each country, in Europe as well as the rest of the world. An example of this topic's actuality is the book "Teachers as Allies" by Wong, Sánchez Gosnell, Foerster Luu and Dodson (for a recension, see Impedovo, 2019). The book is dedicated to engaged and advocated teachers for undocumented children and youth as an act of courage. It invites the teacher to adopt a "dreaming" approach to dealing with undocumented children and, more generally, social issues. Specific legal and didactical preparation and, also, imagination is needed. Dreaming is a necessary attitude which teachers can embrace for hoping for a better future for students.

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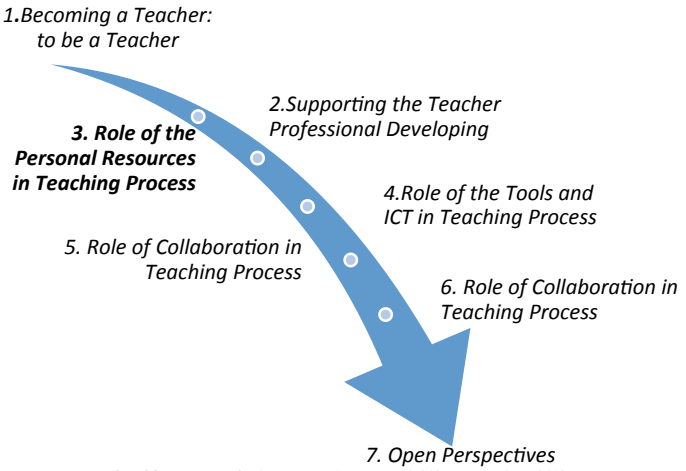
Chapter 3
Personal Resources

Abstract The chapter explores the personal resources of self-efficacy, self-regulated learning, teacher agency and readiness. As shown by some research, these internal resources help teachers be able and willing to address the educational changes and introduce innovation in their teaching practices. Considering the role of personal resources, a discussion is open to question the contemplative practices, regarding funds of knowledge and funds of identity that valorise teacher' personal past and emotional life.

Keywords Self-regulated learning · Agency · Readiness · Funds of identity



A sense of efficacy of the teacher's ability and willingness to address educational changes and realise innovations in teaching practice are considered features of the teaching profession. In this chapter, the aim is to see how these dimensions are correlated one with the others. The chapter also explores the personal resources of self-efficacy, self-regulated learning, teacher agency, and readiness. These internal resources, as shown by some researches, help teachers to be able and willing to

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address the educational changes and to introduce innovation in their teaching practices. A discussion is open to question the contemplative practices, regarding funds of knowledge and funds of identity that valorise teachers' personal past and emotional life as subjective resources.

3.1 Activation of Self-Efficacy

Self-efficacy is the belief of one's own ability to organise and implement a course of actions necessary to properly manage a situation in a particular context and achieve a goal (Bandura, 1997). Different studies have underlined that teachers with high self-efficacy have a greater tendency to innovate.

Bandura defined self-efficacy as an individual's "judgments about his or her capabilities to organize and execute courses of action required to attain designated performances" (Bandura, 1986, p. 391). People with the same intelligence and specific abilities, but with a higher sense of self-efficacy, are more motivated to achieve goals. He identifies four primary sources of information for the construction of self-efficacy:

- direct behavioural experience: people who have shown themselves to possess cognitive and behavioural ability have the resources to succeed even in new and complex situations;
- vicarious experiences and modelling: through a comparison with the performance achieved by other models of success;
- verbal persuasion: people who have been incurred are committed in the realisation of their goals;
- physiological and emotional: how people judge their strength and vulnerability could be negatively or positively oriented.

These sources of self-efficacy "continually and reciprocally interact to affect performance judgements which, in turn, influence human action" (Lent & Hackett, 1987, p. 348). Bandura (1997) also stresses the role of the locus of control:

- Internal locus of control means that that decisions and efforts guide rewards in life;
- External locus means that others determine rewards or outcomes with more power than them.

In the first case, if they fail, they believe it is due to their lack of effort; in the second case, due to forces outside of their control.

In his view, personal efficacy is a dynamic aspect of the self-system that interacts complexly with the environment, with capabilities, performance and motivational, and self-regulatory mechanisms. Bandura's self-efficacy theory has been gaining empirical attention in the career literature "as both a mediator and outcome measure of career-related behaviours" (Mau, 2000). Research with adults confirms that personal efficacy beliefs play a highly influential role in occupational development and

pursuits. Different studies have underlined that teachers with high self-efficacy tend to innovation's processes and are more open to experimental methods.

3.2 Activation of Self- Regulated Learning

The construct of the SRL is widely debated in the literature. SRL is considered the ability to individually control one's own cognitive, meta-cognitive and behavioural learning processes, and maintaining an appropriate justification and effective management of one's own emotions (Zimmerman, 2001). Cognitive, affective, motivational and behavioural components are the elements that compose self-regulation, involving the capacity to adjust the actions and goals to achieve the desired results, despite the changing environmental conditions (Boekaerts et al., 2000). So, SRL is a "cross competence" that helps the individual manage their own learning, reacting and interacting with the environment, in a mutual adaptation.

Widely considered in literature is the socio-cognitive model developed by Zimmerman (2001). He identified the learning process in:

1. Metacognition, indicating reflection on one's cognitive activity, expressed in constant analysis and evaluation of its course;
2. Motivation is the awareness of objectives, analysing the causes of their success or their failure and focusing energy towards the final goal;
3. Behavioural, exercising choices and controlling them during the activity.

The SRL becomes a process directed by the student to transform mental ability in an operational capacity concerning a specific task, which is carried out in three phases of the cycle:

1. Forecast phase: to predispose particular objectives according to the analysis of the task and mobilise all motivational resources able to give impetus and direction to the action to be taken. This phase consists of five sub-processes: goal setting; planning; self-efficacy; goal orientation, and intrinsic motivation.
2. Provision phase: it occurs during learning and concerns self-control and self-observation. These processes help students to focus on learning, enhancing performance and achieving its goals. It consists of self-control; the use of mental images; self-observation and information, behaviour and the environment.
3. Self-reflective phase, involving assessments of the tasks, and subjective reactions that are cognitive, emotional and motivational to the results.

A representation is seen in Fig. 3.1.

This model was enriched by Winne and Hadwin (2008), attributing more importance to meta-cognitive factors and cognitive strategies aimed at adapting to the task. The model Pintrich (2000) recognises four stages in the self-regulating processes, not linearly ordered: anticipation, planning and activation; monitoring; control; reaction and reflection.

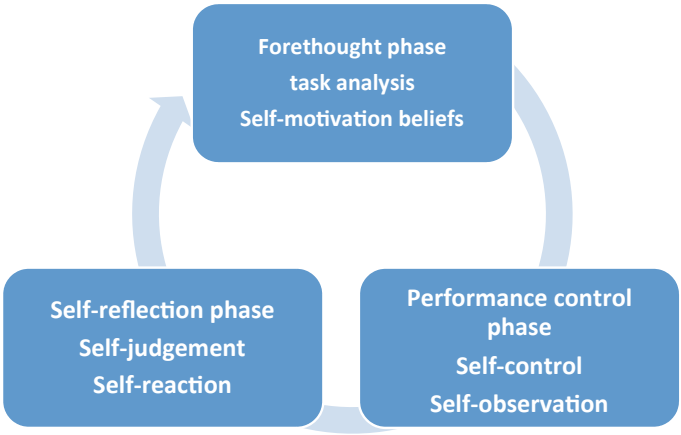

Fig. 3.1 Zimmerman model (2001)

Azevedo (2008) believes that the various main stages of SRL (planning, monitoring, control and reflection) are not regular. He demands a clarification on the multitude and overlapping constructs to build a unified framework and model of metacognitive monitoring and control.

Considering the complexity and variability of the SRL theoretical model, it becomes interesting to explore how to analyse this construct operationally (for an example of research on online regulation see Impedovo, 2017). The variety of models and theoretical differences may be a problem for analysing and measuring the regulatory processes that occur during learning. General research on SRL is evaluated with self-reporting; questionnaires or structured interviews aim to understand how participants set their objectives to plan their education and assess their progress and the practice of self-reflection. There are also measurements like think-aloud, error detection activities, tracking reports, parents and teachers' remarks. Researchers have attempted to propose standardised instruments and assessments. Given this variability, Azevedo and Jacobson (2008) consider that, despite the literature's maturity over the last two decades, a single standard for the measurement of SRL does not appear to have emerged, with more measures generally preferred simultaneously, able to take into account more aspects. A multi-method approach captures self-regulatory learning as linearly and recursively.

SRL means taking on the responsibility of the apprentice for their learning process and cannot be considered an absolute state of cognitive, stable and static functioning, but must be seen as subject to a continuous dynamic of changes over time, due to the changing of its psychological, environmental and behavioural determinants. The SRL also allows for the need for immediate gratification (which would otherwise lead to procrastination): "This may seem to conflict with the power of agency, but can be explained simply by suboptimal self-imposed plans compared to the one given by the teacher".

Therefore, SRL is a central theme for reflection on the skills needed in a knowledge society. It also emerged from the "European framework for improving and reforming education systems" to better prepare students to be future effective citizens.

Each subject with SRL considers himself or herself an agent of their behaviour, recognising learning as an active process, seeing themselves motivated, and using strategies that allow them to achieve the desired result. Developing aspects of the SRL also means transferring these aspects outside of school, meeting the multiple needs and competences of today's society, by crossing borders that lead towards dialogic learning processes (Akkerman & Bakker, 2011).

If until now most of the research has focused on predefined learning in an educational or professional context, today there is no denying the importance and role of complex social and institutional networks that activate interdisciplinary and inter-organisational collaborations, mixing formal and informal learning. These situations require making transitions and relationships between multiple practices and perspectives rich and exciting, leading to mutual enrichment and potentially to dialogic learning processes (Akkerman & Bakker, 2011), with a central role played by technology to support between dialogues.

3.3 Teacher Agency as a Dynamic Resource

A subject that brings a lot of interest at the international level is that of the theme of "teacher agency", that is to say, the "agency" of teachers. The concept of agency (which we also find translated as "the power to act" and "agency" or "Human Agency" in English) is linked to the expression of one's own will in actions that transform reality (Ahearn, 2001). This concept focuses attention on the individual (and groups) on the transformation of reality, with implications for the way of acting, learning and the forms of expression of self-identity: "Agency is manifested when people formulate intentions and carry out voluntary actions which go beyond accepted habits and given conditions of the activity and the organization in which they are registered, and then transform them" (Engeström & Sannino, 2013, p. 4). Even if the subject of the agency is discussed in the educational and psychological literature, the agency of teachers still needs to be studied in more depth, particularly in the area of professional development.

The term "agency" very often appears in contemporary academic writings at the international level. The agency concept is often applied without an explicit definition and requires conceptual clarification and a clarified methodological approach.

Human agency is a multidisciplinary concept, highly valued in Western society, which exalts "the man-made by himself" (self-made man). Autonomy, the capacity to overcome and accept challenges, the ability to be an entrepreneur of oneself, are emphasised. In general, the agency indicates the power of a person to act on their environment by transforming it by proposing ideas, choices, expressing their own "voice", self-determination, and free will. Agency focuses on the individual

as an agent of transformation, with implications on the action, learning and self-expression. Simultaneously, the power to act, considered in a developmental situated space between the individual and the environment, transcends the individual and society boundaries. In what follows, we will approach specific social theories in more detail, particularly in a socio-constructivist vision. A rich discussion is dedicated to the agency. The way students interpret the concept of agency can be very different. It is due to its character closely linked to other concepts such as self-efficacy or empowerment. This theme, therefore, opens up a vast reflection between thinking and acting.

In psychology, the notion of agency emphasises local, micro and individual social action, constituting the active and subjective components of variable social action. From a socio-cultural psychology perspective, a particular activity must be examined in the social context, considering individuals as cultural agents (Bruner, 1990). The subjects actively create personal meanings concerning a given situation which can be negotiated in social interaction. An individual agency makes it possible to redefine social practices where culture functions as a tool for transformation and production for new meanings.

In educational literature, the agency of teachers refers to the capacity for action in a school context. It is an essential dimension of teacher professionalism. Indeed, teachers' agency to professional identity allows examining how teachers experience the world of school, about educational practices. The study of the teachers' agency will enable us to explore their relationship with the world of school. Here, teachers' agency is the opportunity, the will and the ability to act, influence and transform activities and circumstances in their professional life.

Agency can be considered as a temporally embedded process of social engagement (Emirbayer & Mische, 1998) which is:

- influenced by the past;
- oriented towards the future considering alternative possibilities;
- engaged with the present of here and now.

Priestley et al. discuss the agency as an emergent phenomenon, in the interplay of available resources, individual efforts, contextual and structural factors.

In an ecological view, Priestley et al. enrich the notion of teachers 'agency by taking into account:

– the teachers' general life choices and their more specific professional history;
– the short-term and long-term orientations of their actions and the role of discursive practices; resources that promote or hinder agency;
– the wider physical environment in which and through which agency takes place; relational aspects.

In their ecological vision, the agency is seen as an emerging phenomenon that results from the interaction of individual efforts, available resources and contextual and structural factors. These views make the agency "a contextually enacted way of being in the world" (van Lier, 2008). In the following section, we focus on a specific personal attitude, which we refer to as readiness.

3.4 Readiness

Readiness comprises what individuals know, can do and value. Billett (2015) applies the concept of learner readiness in the healthcare setting. In a socio-cultural constructivist account, the learning is mediated by the kinds of activities in which learners engage as afforded by the social world. Consequently, readiness refers to the individual's abilities to engage with and learn effectively from what they experience, shaping the scope of their learning potential. As Billett (2015) proposed, the point is how learners (i.e. students, apprentices, workers) come to make sense of what is experienced, construe meaning, and learn through this. Specifically, the author proposes that there are three broad dimensions of readiness associated with the knowledge required for practising healthcare professions, as follows:

i. *Conceptual, factual, propositional (what is known)*: this readiness is about being able to make these links and associations thanks to the repertoire of experiences to form purposeful associations and linkages. Thanks to this kind of experience, conceptual associations might arise.
ii. *Procedural readiness*: *the capacity to achieve goals (what can one do)*, such as healthcare work when taking blood. In this case, readiness is likely derived from having had sufficient experience in taking blood samples to perform that procedure without recourse to conscious engagement in that task.
iii. *Dispositional readiness (what value)*: this is the level of occupationally-related dispositions required to draw upon and utilise their knowledge effectively when, for instance, interacting with patients.

According to Billett (2015), these dispositions are central to how individuals mediate the effort exercised in their learning. Hence, the importance of engaging in authentic activities that require the deployment of these three forms of knowledge interdependently is essential: "How, for what reasons, and by what degree individuals elect to engage in goal-directed activities is central to what they do and learn" (Billett, 2015, p. 4). This readiness is related to teacher agency, which concerns the awareness or experience that shapes what teachers do, how they think about what they do, and what they will be in their profession. Active crafting of experiences is crucial for successful professional learning and development.

Teacher's sense of readiness (Impedovo & Ferreira-Meyers, 2019) is considered the attitude expressed by teachers about:

i. -how they expand knowledge thanks to the repertoire of experiences (what is known);
ii. -the attitude about the capacities to achieve goals from having had sufficient experience (what can one do);
iii. -the attitude about the level of occupationally-related dispositions required to draw upon and utilise expertise.

A Theoretical Focus: Typology of Agency In this section, we explore the typology of the agency that it possible to retrace in literature, as based on the work of Ligorio et al. (2017):

1. *The individual agency*, referring to the intrinsically subjective nature of agency, is mainly expressed in the first person. This type of agency is inspired by Bandura (2006). A different form of agency can be retracted. The subjective agency is intended as having control over one's actions. In this case, the person emphasises the activities and attributes them to her/himself. The proxy agency is a personal action emphasising the intention to act and with interest in seeing others' reactions. Again, the inspiration is Bandura's (2006) work and, in particular, his reference to the socially mediated agency.
2. *Interpersonal agency* encompasses a relational attitude, involving the capacity to work with others. This category is built upon Matusov (2001) and Marková's (2003) definitions of intersubjectivity, implying that participants have something in common and deliberately attempt to coordinate their contributions, although maintaining their perspective. We can consider related to this agency also the declared agency, which includes recognising others' opinions, evaluations and statements 'offered' as pieces of talk to be used by others for generating a follow-up of a previous statement or request. Most of the time, this is a rhetorical ploy to seek consensus or engage the other's attention.
3. *Relational agency*. This type of agency allows the recognition of skills and sensitivity to collaborate with others, provide and receive help, and acknowledge others' needs. It expresses sharing and supporting ('I agree') toward the goal of the discussion, looking for a common position.
4. *The epistemic agency* is expressed through actions attempting to attain epistemic goals and forming beliefs. This type of agency conveys ideas involving an authoritative and responsible act, applying knowledge and skills.
5. *Collective agency* is conceived as a feature of the group rather than the sum of individual activities, building a distributed capacity to act as a group. A shared and joint effort and the prospective to reach the collective aim can be retrieved. Bandura (2006) stresses the group's interdependent effort in sharing knowledge and expertise to achieve complex goals.
6. *Transformative agency* refers to breaking away from the standard and consolidated actions to initiate new perspectives and new practices. This agency is pivotal in moving a process of transformation forward. It is not associated with an individual; instead, it is produced through multiple actors' strategies, each taking actions that help the system progress through different stages of transformation.

3.4.1 From the Research*: Agency After a Master's Course*

In this section, we will report on a study about how participation in a master's degree in international vocational education has influenced teachers' agency. The concept of agency is conceptualised to professional development (Impedovo & Ligorio, 2016). To pursue this objective, we interviewed 16 teachers at the end of the master's course. Through these interviews, we explored teachers' agency's perception after having completed a master's degree in international education (for more details, see Impedovo, 2016).

The development of agency skills in teacher education supports innovative action education in the school context. In a continually changing context, teachers are confronted with social, institutional and political reforms, such as the massive introduction of educational technologies or the implementation of the results of international surveys. Teachers are invited, directly or indirectly, to challenge, improve or update their skills to adapt and manage innovation. In-service education offers teachers many opportunities to learn and develop skills. This article seeks to understand and describe professional development characteristics that encourage deep learning and involve active action. It also explores teachers' activity concerning their professional development to acquire research skills and orientation in science education. In sum, the focus was on how participation in a master's course has impacted teachers' perception of agency.

For this reason, we will study two groups of teachers at the end of their master's course (first and second edition). We argue that participation in professional education (aimed primarily at developing educational research skills) would encourage and nurture teachers' perception of activity. This perception of the agency could encourage teachers to implement new professional practices.

These teachers have completed a two-year full-time, joint international Erasmus Mundus education research master's course, co-directed by one Belgium and one French university. The interviews were analysed considering three main categories listed in Table 3.1.

Regarding the agency about professional choices, the interviews show that teachers express their agency because it is linked to a continuous process of selection, contextual and relational constraints. This agency responds to the advantages and conditions of a particular context (Biesta & Tedder, 2006). The formative master's course motivated the teachers and developed their desire to acquire professional knowledge and start innovative practices.

The challenge of introducing new models and learned strategies can create tensions and opportunities in the local community, with a delicate negotiation of appropriation.

Understanding and supporting teacher agencies' development is essential in today's dynamic world to make teachers more independent in their professional approach (Tse et al., 2017).

Table 3.1 Dimensions for the agency in professional developing

Dimension	Description
Agency about professional choices	To express an individual future-oriented activity. Singular first-person action verbs (I choose, I have become, I would like to, etc.) combined with singular pronouns (I, me, my, etc.)
Agency about the academic community of belonging	References to personal or collective actions related to professional responsibility (my students, my colleagues, my supervisor, my community, etc.)
Agency to professional practices acquired through research education	References to personal or collective professional knowledge. Action verbs combined with abstract regards (my subject, my experience)
Agency to transform personal, professional practices	References to change and transformation of innovative practices (I, me, my, my) about professional development
Agency to transform collective professional practices	To express a collective, to do or to have done in the future. First-person plural action (we do, we choose, we will try, etc.) combined with plural personal pronouns (we, our, etc.)

3.4.2 In the Practices*: Contemplative Practice in Teacher Education*

Teachers are subjected to intense tension due to social and cultural changes, such as education reforms and technological innovation. For all this motivation, the teacher's role could be a stressful profession. Indeed, teachers are in the helping profession but at risk of burnout (Hobfoll, 2001). This situation becomes even more pronounced for teachers at the start of their career, considering the struggles with the new professional role's demands. Thus, the early-career teacher must be equipped with coping strategies and skills to manage such tension, especially in transition moments like the passage from the university to the classroom setting. This consideration should lead to a rethink about the optimal education programmes for the professionalisation of teaching.

In teacher education, recently, the research has considered the importance of proposing mindfulness practices for teaching staff to promote well-being (Siegel, 2010). In the same way, there is recent interest in the scientific investigation of contemplative practices applied in education and teacher professional development. Such practices' basic idea is to help individuals become conscious and capable of coping with new difficulties and complex problems.

Contemplative practice is not a new concept; instead, it has its roots in history through various nations worldwide (Gethin, 2011). For example, mindfulness is generally regarded as a form of contemplation, which focuses on the consciousness aspects and involvement at the moment to moment experience. Such practices have many nuances.

From the student perspective, Shapiro et al. (2011) recommend that the contemplative practice is conducive for reducing stress for better academic achievement. Teachers can incorporate contemplative practices in their teaching to bring quality into their classroom (Impedovo & Khatoon, 2016). The daily application of these practices with students and their personal lives can bring noticeable changes. There is a link between staff well-being and school performance for a more institutional perspective, considering the staff well-being the critical factor of school success. Mindfulness can be an exciting practice and useful in reducing stress for pre-service and early career teachers involved in the transition between university and classroom.

It is significant to consider how to introduce contemplative practices in the teaching education curriculum and deal with the teacher interested in these activities (Impedovo & Khatoon, 2016). We recommend that it can be introduced in the following way:

- Introduce the topic by a theoretical path to understand the validity and usefulness of these practices;
- Free up the teacher and the student to participate in these activities;
- Manage and accept any resistance by the teacher and the students;
- Propose examples of application for students in the classroom for their personal development;
- Encourage participation in online groups and networks to support implementing the practice in teaching and personal routine.

In conclusion, we consider these practices useful to bring added value to the education of future teaching. However, this implementation is hampered by the lack of clarity and knowledge of such practices in teacher education institutions, often seen as "weak" techniques and approaches. It will be useful to design activities and paths with contemplative practices flexibly, approaching the teacher and students slowly to consider these practices as valuable tools for personal and professional growth journeys.

Finally, technology can also help to improve the reflection and application of contemplative skills. The role of the system is to support new rules which have many potentialities for professional development.

3.4.3 The Idea in Brief*: Funds of Knowledge and Funds of Identity*

Funds of knowledge research are concerned with social justice issues (Hogg, 2011) and highlight the way people live in a mutually constitutive manner (Gutiérrez & Rogoff, 2003). Therefore, the skills and bodies of knowledge that minoritised learners possess are historically accumulated and culturally developed for household or individual functioning and well-being (Moll et al., 1992, p. 133). These skills should be seen as epistemologically equal to academic knowledge bodies that constitute the

formal curriculum in schools. However, despite researchers' findings, minoritised teachers often perceive learners' funds of knowledge as having little epistemological value in the mainstream classroom (Zipin, 2009). For this, researchers could help teachers sustain the deconstructing and dismantling of their deficit thinking about their students to recognise the epistemological, emotional and ethical value of the resources that students bring with them.

Esteban-Guitart (2016) develops the funds of identity concepts. It mobilises the identities of minoritised students in educational settings for social justice purposes. Two concepts are related: the dark funds of identity (Charteris et al., 2018), defined as the problematic experiences that individuals bring with them to make sense of theoretical concepts in the classroom; and the existential funds of identity (Poole, 2020), defined as the positive and negative experiences that adolescent learners develop and appropriate to express themselves and to grow as human beings. Poole (2020) considers:

> Both concepts stress how negative emotions and experiences connected to the vicissitudes of daily life and daily occurrences, such as school failure or love, can be harnessed by teachers and researchers to create pedagogical connections between the classroom and the home. (p. 2)

According to the authors, funds of identity research has mostly focused on positive experiences and emotions and has been studied traditionally through research instruments such as visual strategies or cultural artefacts. Researchers have also divided funds of identity into five major types or categories:

1. Geographical funds of identity (such as a river, a country)
2. Practical funds of identity (any activity, such as work, sports or music)
3. Cultural funds of identity (artefacts, such as religious symbols, national flags or social categories)
4. Social funds of identity (significant others, such as relatives, friends, or colleagues)
5. Institutional funds of identity (any social institution, such as family, marriage, or school).

Poole (2020) stresses how positive and negative emotions and experiences can be combined in students' experiences and enable teachers to work through their deficit thinking and find a combination of methods and new concepts to valorise the lived experiences.

3.4.4 Professional Insights: The Teacher' Personal Past and Emotions as Professional Resources

The teachers' personal resources (agency, self-efficacy, etc.) can be activated in autonomous self-observation and supported by the community for collective empowerment. It is essential to stress the idea that the teacher's personal (emotional, social,

experiential) past could play a role as professional resources. The teachers have not to cut off their peculiarity but valorise their unicity in the teaching practices. It can be a personal background made up of emotional, social, professional experiences (not in line with the main path), developed in the voluntary associations, informal setting, family, etc. Too often, the international assessment and national criteria to set up teacher education tend to stress the role of the content and the national curriculum to deliver in the scholastic year, aiming to be a "performant" teacher. Indeed, the teachers' personal experiences are not yet evaluated enough as a precious ally in professional development and quality practices.

The same can be discussed about the role of the emotional dimension in teaching. Bisquerra (2009) proposed a model of emotional competencies assumed as

> the group of knowledge capacities, abilities and attitudes necessary to understand, express and regulate the emotional phenomena in an appropriate way. (Bisquerra, 2009, p. 146)

Based on this, Chica et al. (2020) performed an analysis in the Colombian training programme. The authors evidenced (a) homogenous tendency toward not knowing the emotional competencies in the educational processes, and (b) emotional education in the complementary training programs of the Teacher Training Schools in Colombia approached with a pre-scientific focus. They concluded, "to see how a vulnerable generation of teachers is being trained effectively and without the sufficient tools to manage the emotional situations of their teaching performance, must raise commitments with new ways to understand and conceive comprehensive education" (p. 294).

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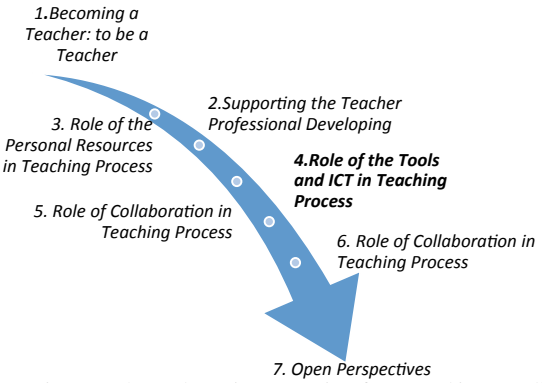
Chapter 4
Role of Digital Tools and ITC in Teacher Practices

Abstract In this chapter, the concept of appropriation, tools and scripts is introduced, with a research example of teachers' appropriation of iPad in the classroom. Then, the perspective of socio-materiality is here considered as a framework to analyse teaching practices. Research is presented about ITC social and material appropriation, focusing on artefacts in a socio-cultural approach. Critical views of educational technology are useful considering the impact of global crises, as the Covid-19, asking for questioning traditional curricular theories.

Keywords Appropriation · Tools · Scripts · Socio-materiality · Artefacts · Curriculum



During teacher education, ICT is often used in a traditional pedagogical setting, rather than to help with the construction of students' knowledge. Consequently, student-teachers' experience of using ICT pedagogically is somewhat limited. Thus, once in service, future teachers tend to reproduce the same uses (Koh & Divaharan, 2011), or to add technology to traditional learning methods only. It appears that only after several years of experience do teachers begin to incorporate more critical approaches to the integration of technologies.

In this chapter, the concept of appropriation, tools and scripts is introduced, with a research example of teachers' appropriation of the iPad in the classroom. Then,

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the perspective of socio-materiality is here considered as a framework to analyse teaching practices. For this, research is presented about ICT social and material appropriation, focusing on artefacts in a socio-cultural approach. Critical views of educational technology are useful considering the impact of global crises, such as Covid-19, asking for questioning traditional curricular theories.

4.1 Appropriation, Tools and Scripts

The teaching professions require a broader and sophisticated set of competences. Digital devices are ubiquitous and open a new path. Europe proposes the European Framework for the Digital Competence of Educators (DigCompEdu) to orient toward digitally competent teachers. The model is directed towards all scholastic levels of educators, including vocational special needs education, and non-formal learning contexts.

Technology integration is a broad topic of discussion in education. It is possible to find different levels of integration and use of technology by teachers.

The teaching subject is considered an internal factor that influences teachers' perceptions of digital technologies' value (Orji, 2010). However, the teaching and learning effects of ICT depend also on how educational technology is used (Bielaczyc, 2006). For this, it is crucial to understand and limit the barriers that schools and teachers encounter during appropriation and use of ICT.

Different approaches have been developed to describe and analyse various teachers' processes of technologies' appropriation regarding acceptance, rejection and use of a device in educational contexts. Adopting new technology is typically performed through replacements and transformations. Many schools have completed the replacement stage, which entails to take an existing resource and replace it with a relatively similar new digital aid. On the contrary, transformation occurs when a process or a resource is wholly changed, implying a learning method's rebuilding process. The appropriation notion is employed when the user begins to use the artefact in their environment until a fruitful utilisation. Jones and Issroff (2007) defined the appropriation in terms of how a particular technological artefact is adopted and shaped in use.

The appropriation process also includes aspects concerning the mutual influence between the technology and the users (Overdijk & van Diggelen, 2008), with a simultaneous transformation process, including the learner and the tool. This mutual shaping process between the device and the subject recalls an instrumental approach (Rabardel, 1995), based on the distinction between artefact and instrument. An artefact is an object of the human activity that has been designed for specific activities. The user builds and develops some cognitive structures (the schemes) using the artefact to carry out a task. An instrument is a mixed entity: according to Rabardel (1995), the instrument is constructed through an instrumental genesis, a bilateral relationship between the tool and the subject. The teacher makes choices in their usage of the

device within the educational practice by 'adapting' it in goal-directed activity. At the same time, technology gets its form and meaning during social interaction.

According to an ecological perspective, the process of appropriation is interactive. It implies the assimilation and the accommodation, as well as changes, the possibility to adapt the technological device to fit personal, interpersonal and social-cultural requirements. Indeed, the success of new technology is determined by human factors that mediate the adoption and its use.

The teacher education institutes give more responsibility to an adequate technical education level for future teachers or teachers already in service. Indeed, the development of technological expertise is considered a priority for future teachers.

Finally, introducing any new technology in an academic institution generates tensions between an old system of working and the new one, which need to be accommodating and assimilated by all the community involved. At the same time, the students, the teachers, and all the school administration, supported by the ITC office or researchers, have to make sense alone and in a group of the new technology, finding a unique opportunity of learning and action. In this end, human factors mediate success in the adoption and the use of technology.

4.2 Socio Materiality in the Teaching Process with ITC

Schooling is a specific practice of learning by designated spaces in which agents use particular tools for educational purposes, simultaneously in the ontological time-space of their classroom (Hamilton & Zufiaurre, 2014). New technology came to challenge this traditional setting. Together with augmented reality and social robotics, one of these is the virtual reality system or Virtual Reality (VR) and social robotics. Indeed, the change in educational setting derived by the introduction of new technology has only recently been investigated regarding how people discursively arrange the context of their activity spatially and temporally. For this, an interesting perspective to analyse the change caused by the introduction of technology is the socio-materiality perspective.

The socio-materiality perspective addresses tools, artefacts and language as part of human actions that create meaning in a social dimension that is inseparable from the classroom interactions (Cabello et al., 2019). The learning materiality is distributed relationally (Sørensen, 2009). This relational materiality is often overlooked in educational research, dismissing how space is represented in artefacts such as diagrams or images constructed in educational practices.

In socio-materiality, a central role is given to the language. Indeed, teachers and students are involved in continuing explanation and interpretation of tasks in the learning environment. For example, virtual reality introduces and could transform teaching practices with new modality and an extended simulated setting. Considering the change in the context's configuration due to the introduction of virtual reality in an educational task, students and teachers need to make sense and negotiate the spatial and temporal here-and-now of the activity. The process of sense-making is

considered a ubiquitous process of making the "ever-new moments" of experience "familiar, understandable and even predictable" (Martsin, 2012).

The socio-material perspective also englobes the reference to the body. The embodiment concept has gained currency in recent years, particularly in light of new forms of interaction and engagement with emergent technology. This perspective offers rich reflections for conceptualising the relationship between the body's physical actions and meaning-making processes.

In a socio-material perspective, the spatial and temporal dimension is also important. Researchers have recently begun to explore the spatial dimension of classroom discourse (Ehrenfeld & Horn, 2019), expanding from an analysis of language alone to the analysis of multiple modalities to describe the situated nature of teaching practice. The work of Shapiro, Garner et al. (2020) visually and dynamically explores the spatial and temporal dimensions of classroom discourse. This work sees the application of the methodology called "Interaction geography" as an integrative and multiscalar approach to studying how participants' physical movements can be embodied resources for sense-making and learning in a physical environment (Shapiro et al., 2017).

***A theoretical Focus*: The Artefact in the Sociocultural Approach** Artefacts are elements of mediation between individuals and the world, changing their experience and their cognitive processes (Cole, 1996). Artefacts are elements of mediation between individuals and the world, giving new meaning to the flow of the experiences. Artefacts are a process of communication between the subject and others around an activity, the externalisation of knowledge (Bruner, 1990). The concepts of mediation and artefact are crucial in the Vygotskian perspective. This concept postulates that humans do not have direct access to reality, but that they need mediation tools. The ability to influence the psychological structure remains an essential function of mediation instruments, which are renamed artefacts just to emphasise the fact that they are not objects given in nature, but are the facts with art; these interact and at the same time shape the mental processes of those who built and used them. Examples of artefacts are the language, digital systems, works of art, diagrams and maps, with a social and psychological role. Indeed, artefacts are externalised in the form of mental processes. The manifestation of mental activity occurs on two levels: the material tool used to carry out a particular activity; a psychological level, internalised when the action becomes symbolic. So, in the first level, we learn how to use a specific tool, and subsequently, we internalise it; that is to say, for example, first the focus is on learning to use a pen to write, then thinking about the writing activity without thinking about how to use the pen.

In summary, artefacts mediate our actions on the world and therefore determine psychic processes. Therefore, the invention of a new artefact is a form of objectification of a new approach, which is then shared and socialised in a community, making possible renewed processes of creation. Artefacts are the

results of a communication method between an individual and others around an activity. Indeed, the design of complex artefacts requires more knowledge than one person alone can possess. So, in a community, it is possible to use multiple points of view and argumentation to design complex artefacts. Recent attention to design learning contexts focuses on creating concrete knowledge objects (e.g., reports, models, scheme, maps, figures or videos). They are derived from collective participation of all community members, putting in joint efforts and resources.

4.2.1 From the Research*: Social and Material ICT Appropriation*

It is essential to determine the conditions necessary for the use of technology in teachers' education to bring positive and profitable results in student-teachers' progress, like exploring the perception and the use of educational technology. For example, in the French context, Impedovo et al. (2016) propose a discussion of the five categories that emerged from the analysis of ITC appropriation by teacher educators in a school of education: prescriptions versus personalisation of ICT tasks; technical versus pedagogical ICT teacher educators' education; required use versus student-teachers' ICT skills; technical features versus subjective resistance in online learning environment use; and issues in the use of the ITC. The categories are in Fig. 4.1.

In the following, the four categories are analysed.

a. *Prescriptions versus Personalisation of ICT Tasks*: the results show the difficulties in translating the national directives into the practice of teacher education. The implementation has required resources and coordination for the ICT tasks organisation. Rey and Coen (2012) considered that most teacher-education institutes rarely base their technological decisions on specific published research findings. Instead, they often start by thinking about the intended results that

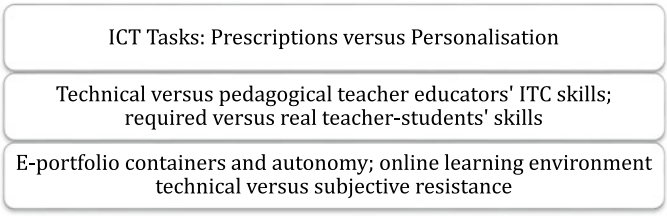

Fig. 4.1 Contrastive categories' axial coding of ITC appropriation (Impedovo et al., 2016)

technology should provide within their school environment. So, it has been found that the use of ICT is below initial expectations.

b. *Technical versus pedagogical teacher educators' ITC skills; required versus real teacher and students' skills*: this emphasises the necessity of providing specific ITC education for student teachers, especially in the first year of their master's course. Indeed, even if they are considered "digital natives", teacher-students don't have all the necessary knowledge, skills, and attitudes to use educational ITC correctly. Although equipped with advanced computer skills, student-teachers find different difficulties in using educational technologies, especially when there is a lack of vision about their usefulness in professional practice. Understanding the dynamic between technological expertise and academic discipline also reveals an essential factor in integrating ICT.

c. *Containers and autonomy of the e-portfolio; technical versus subjective resistance of the online learning environment*: for teacher-educators and teacher-students, the ePortfolio and ITC technology were not yet "light and invisible", considering the technical difficulties involved in its integration and appropriation. Sometimes the use of educational technology shows a degree of "unwillingness to change" (Lasky, 2005, p. 913). A slow process of adoption leads to meshing new ideas with well-established beliefs and practices.

4.2.2 In the Practices*: The Case of the iPad*

The value that iPad entails in education is widely discussed (Murphy, 2011). The integration of iPads in the classroom requires efforts in terms of adaptation to reach qualitative changes (Jones & Issroff, 2007).

Various studies have documented forms of teachers' rejection or low-level use of new technology despite the availability of tools in the classroom. The traditional education courses for pre-service or in-service teachers do not provide specific learning skills to manage an adequate appropriation of new technologies.

As an example, we propose a study focused on teacher iPad appropriation (Boéchat-Heer et al., 2015, 2019). The authors focused on comparing two teachers' focus groups on analysing the appropriation process of the iPad.

The process is summarised in Table 4.1.

The teachers' voices highlight the specificities of the research experience, recognising the complexity of the appropriation.

The study shows that iPads bring new possibilities to the learning environment. However, the analysis reveals that teachers use digital tablets to support their academic activities, without a real change of their usual teaching practices (Jones & Issroff, 2007). The classroom configuration does not change; the students are not involved in networking activities; each pupil is behind his/her desk, more or less, as is the case during a traditional lesson.

The introduction of technology in education has to be considered concerning the institutional culture. Moreover, if the institutions promote innovation through

Table 4.1 Summary of the four dimensions about iPad appropriation (Boéchat-Heer et al., 2015)

	Dimensions	From	To
I	Management of technical features	Technical features	The social shape of the iPad's use
II	Management of socio-relational aspects	Individual perspective	Collective appropriation
III	Management of didactical and pedagogical aspects	Tools	Instruments
IV	Management of subjective strategies	Resistance	Engagement

sharing, teamwork and accepting the related risks, teachers will be more likely to engage. Indeed, as reported in the study, teachers' professional expertise about ITC can be improved if teachers are continuously involved in sense-making processes for their activities, for example, through negotiation and discussions between them.

4.2.3 The Idea in Brief*: Covid-19 and Materialized Reflection*

Since the spring 2020 semester, the Covid-19 pandemic has been spreading throughout the world. The epidemic caused shutdowns to schools and universities. The immediate change imposed on the world by the Covid-19 epidemic forced all educators to act and react with urgency. The hunting for the best digital tools began, in particular for video meetings. The necessity of integrating technology creates opportunities for educators to examine their work and how different tools and resources can enhance learning (Ruggiero & Mong, 2015). The rapid switch to online learning required a profound rethink of everything about courses, such as a discussion about ITC integration and appropriation.

4.2.4 Professional Insight*: Post-critical Curricular Theories*

The emphasis on efficiency and administrative rationality, espoused by traditional education theories, would reflect the domination of capitalism over schooling and curriculum, thus contributing to the reproduction of class inequalities. To advance an education rooted in social justice requires a move toward critical awareness. The teachers become aware of education's politics and recognise that education is not a neutral process (Freire, 2000). Technology, digital resources, software, online application etc. are not neutral either.

Critical views of education call into question the assumptions of existing social and educational arrangements to the aim of subjects' emancipation. So, teachers and students can express their voice and become aware of social structures' control and power. The implication is a multicultural curriculum based on the ideas of tolerance and respect (Lopes & Macedo, 2011).

Post-structuralism and postmodernism perspectives focus less on matters of power to discuss the whole modern Western philosophical and scientific tradition. Teachers are invited to take ownership of the different forms of reading and interpretation of reality, going beyond technical rationality. For example, Rezende and Ostermann (2020) provide some in-depth analysis of teacher training curriculum in Brazil to consider the social reality and pay attention to real students of Brazilian public secondary schools: "young people living social and productive relations marked by exclusion, by the lack of future project, by technological complexity and the media" (Kuenzer, in Rezende & Ostermann, 2015). Another example is proposed by Boone (2020) about how Brazilian black women experience double oppression—race and gender: "The early childhood education profession primarily consists of female teachers which historically has been informed by the perspectives of white males". Black women teachers' every day active involvement in social change and activism produces risks like challenging authority and avoiding compromising. A new relationship with knowledge could mediate a new understanding of experiences and practices:

> "The teacher does not possess education as an object. Education is not a possession of this sort. The teacher can only bear witness to the truth of education. (…). The Teacher is like Moses: they set the captives free but cannot enjoy the same freedom for themselves. (…). The teacher is at most a student". (Rocha, 2020)

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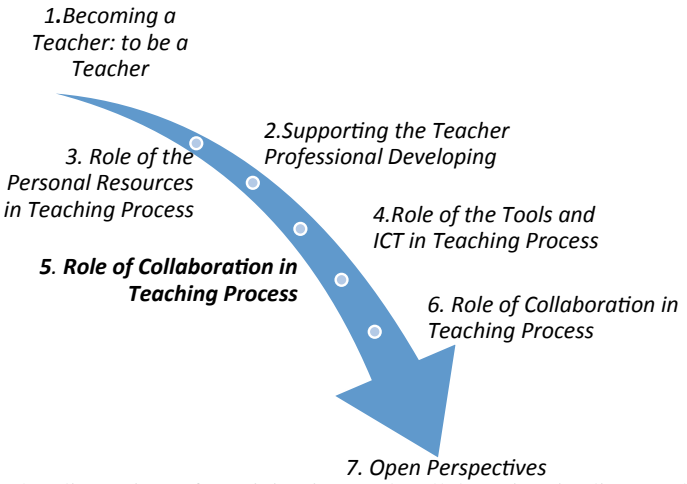
Chapter 5
Role of Collaboration in Teaching Practices

Abstract The dimension of participation and collaboration is discussed in the light of learning and professional development. Participation is a social experience that triggers negotiation processes, especially when there are some goals, shared resources and modality of action (van As, 2018). Collaboration evidence the power of the peer for mutual enrichment. Participation and collaboration push toward innovation in leadership by building new links between individual action and social change. Knowledge Building in the classroom shows the power of the social dimension in the learning process. The potentiality of peer collaboration is progressively shaped by digital social media, like social networks, which impact practices and modalities of resources access. A relational agency is activated to build epistemic collaborative communities that could support change and introduction of innovation.

Keywords Participation · Collaboration · Professional development · Social networks · Relational agency · Epistemic collaborative community



The dimension of participation and collaboration is discussed in this chapter in learning and professional development. Knowledge Building in the classroom shows

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SpringerBriefs in Education,
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the power of the social dimension in the learning process. The peer collaboration between teacher and researchers is conceptualised as a professional dynamic oriented to transformative change. The potentiality of peer collaboration is progressively shaped by digital social media, like social networks, which impact practices and modalities of resources access. A relational agency is activated to build epistemic collaborative communities that could support change and introduction of innovation.

5.1 Collaboration and Knowledge Building in the Classroom

Collaborating means working together, which implies a sharing of tasks, an explicit intention to "add value" to create something new or different through a deliberate and structured collaborative process, in contrast to a simple exchange of information or execution of instructions.

The term participation etymologically refers to taking part in interpersonal relationships: in this sense, participation refers to the social experience of living as a member of the community. Wenger (1998) uses the term participation to refer to belonging to social communities, and this belonging allows the construction of the identity given by all the experiences of involvement. Participation and constant interaction within communities develop a strong sense of belonging: in fact, recognising oneself as a participant of the same community leads to feeling part of the community. Participation, therefore, creates belonging by contributing to the definition of one's identity.

Participation in communities of practices produces a sense of belonging that develops on a symbolic-cultural level as it implies the sharing of values, habits and lifestyles. According to Wenger (1998), the perception of familiarity and strong interdependence with others determines a strong sense of belonging and community.

A central role of participation can be found in the model proposed by Scardamalia and Bereiter (2006). The Knowledge Building model is the production and continuous improvement of ideas that have value for a community, through means and tools that increase the probability that what the community has accomplished has more value than the sum of individual contributions. This definition mainly highlights two elements: the importance of advancing knowledge, which we have already mentioned, and the social dimension, which includes the collaborative work in communities (for a French discussion on it, see Impedovo & Andreucci, 2016). The entire community is deeply involved in the creation, production, and improvement of existing ideas or theories. The innovation produced results from the deliberate effort of all individuals who contribute organically to increase the community's social capital. For these reasons, the teacher or moderator pushes the group members to take as their objective both the pursuit of good individual performance and the effort to help build and improve the ideas that will then be made available to the community.

Scardamalia and Bereiter (2006) identify twelve principles that characterise communities of practice:

1. *Real ideas, authentic problems*: the inquiry questions identification that the participants ask themselves to know and understand the world, produce theories that can explain the phenomena we see and solve the problems we come into contact with.
2. *Improvement of ideas*: all ideas shared within the KBC are considered potentially improved. Therefore, all members work to increase their quality, consistency and usefulness.
3. *Diversity of ideas*: the variety of opinions is essential for the advancement of knowledge. It creates a rich environment in which new or better-defined theories can develop; in this sense, it is not intended as an obstacle, but rather as a resource to be used for the progressive refinement of the elaborations.
4. *Rise above*: it is based on the belief that there are no right or wrong ideas, but that the most constructive way to agree on conflicting opinions is to create a new theory that preserves the value of all the arguments exposed.
5. *Epistemic activation*: it is the sense of self-regulation, motivation and responsibility of each individual. Therefore, it indicates the active and intentional participation of each KBC member in the process of improvement and construction of new theories. Everyone is consciously involved in understanding the facts under consideration, negotiating between their ideas and those of others and developing hypotheses and theories. Epistemic activation is a fundamental feature of KBC members and helps us understand the difference between a study mode aimed at individual learning and a method aimed at building knowledge.
6. *Collective responsibility for knowledge*: each KBC member takes responsibility for his/her learning and progression of the community's state of experience. In this sense, not only does the product becomes critical, that is the ideas developed and the theories elaborated, but their construction process. It means producing original or innovative approaches and enriching existing theories and applying them to new contexts.
7. *The democratisation of knowledge*: all participants in a KBC legitimately contribute to the negotiation and sharing of community objectives; members help and support each other and, in taking part in the knowledge building process, develop a strong sense of belonging to the community.
8. *Symmetrical advancement of knowledge*: individual expertise is distributed within the community through members' exchanges. The principle behind this point is "to give knowledge is to receive knowledge" and presupposes a constant flow of ideas, knowledge and theories, because it is through mutual sharing that balance is promoted in the advancement of knowledge.
9. *Construction of knowledge as a pervasive process*: the construction of knowledge is not confined within the KBC or on particular occasions, but permeates the mental and social life of individuals, inside and outside schools, universities and organisations, becoming a custom.

10. *Constructive use of authoritative sources*: in the Knowledge Building model, all information is evaluated based on how functional they are for building knowledge. Students have a value if they contribute to solving a problem or if they contribute to improving the theories important for the community.
11. *Discourse in the construction of knowledge*: knowledge is redefined and transformed through the community's discursive practices whose explicit objective is the progressive improvement of theories.
12. *Distributed evaluation*: unlike what happens typically in schools or workgroups, where the teacher or coordinator evaluates the work done, in KBC the evaluation process is part of the efforts to advance the state of the art of knowledge and is therefore profoundly integrated into the creation of all days, allowing continuous monitoring of activities.

In continuity with a model of knowledge building putting a centrality on the role of artefacts, the model of the trialogical approach is proposed (Paavola & Hakkarainen, 2005)—the Trialogical Learning Approach (TLA). This approach capitalises a different modality of learning, aiming to strengthen them by structuring the teacher, students and group activities around constructing concrete objects intended for real use. In this vision, the artefacts are at the same time instruments and final objects of learning. The trialogic approach to learning is thus defined because it integrates the individual (monological method) and social (dialogic process) components of learning, through a third element: the intentional, collaborative activity oriented to a real object.

The authors propose six principles that can be considered for the design of meaningful learning activity with the mediation of new technology—here applied, for example, to a making space activity with educational robotics:

1. *Organize activities around shared objects.* This principle suggests working on real and shared objects, which have significant purposes outside the group that created them and pushes students to externalise knowledge in a creative effort of tangible artefacts (Bruner, 1990). In making space, different student groups can be involved in a collaborative response to a shared challenge using robotics.
2. *Support the interaction between individual agency and social agency level*, provoking personal and collective transformative initiative. The focus of this principle is on how to integrate unique work with group work, during the construction of shared objects. In the making space, this can be done by defining precise tasks, assigning roles and stimulating reciprocal feedback that reinforces individual and collective interdependence toward the shared activity.
3. *Promote long-term processes in knowledge building.* The accent is placed on subsequent and concrete use of the objects created and on their progressive revision and transformation. For example, the solution archived in the maker space by one group can be shared with other groups in another classroom or a virtual area. Preliminary outputs are shared and commented as objects to improve, making the solutions available beyond the context in which they were generated.

4. *Emphasize development and creativity through transformation.* The result of knowledge occurs either from one form of experience to another or from theoretical-conceptual to practical knowledge. In the maker space, this concept can be applied by combining various types of expertise (analytical and synthetics) and stimulating creativity through different forms of exchanges (virtual, oral, face-to-face, augmented, etc.).
5. *Promote the hybridization of practices and artefacts in collaborative situations.* The TLA underlines the community's value in the broadest sense of the term and, therefore, the need to integrate knowledge, skills and practices from different contexts; hence the suggestion to promote multidisciplinary projects and teams.
6. *Provide flexible tools to support the learning process.* Different technological tools like email, cloud, the wiki could support collaboration and coordination, co-construction of artefacts and shared practices, while could also allow analysis and improvement of collective practices, and support the sense of community.

5.2 Collaborative Professional Learning Through Teacher-Researcher Interaction

Collaborative co-design among teachers and researchers is a powerful approach (Gomez et al., 2018). Inquiry learning environments with teacher and research's active engagement provide new understandings and engagement in the context. Teachers and researchers learn to work together and interpret together the learning environment's structural affordances, opening each other's new prospectives.

This space of understanding can also be a space of tensions and frustration between them. Of course, many other elements influence this relationship, like the students, the institutions, the funding entity etc. Technologies facilitate collaborative design, supporting teachers and researchers' discussions and creating records of design and processes (see Hmelo-Silver et al., 2016).

Teachers and researchers learn by their participation in collaborative co-design. In this mutual involvement, the teachers enter the research world and the researchers have direct experience in the teaching and learning ground. Also, suppose the collaborative co-design involves a mutual implication. In that case, both can be considered newcomers at the beginning of their interactions: the teachers discover the research methodology, languages and academia related issues like the ethics and privacy protocol; the researchers are newcomers of the specific school dynamics, on which they will interact for a particular period.

Both of them are in a learning position, and they open the path for guided participation (Rogoff, 2003) reciprocally. Based on general availability for communication, teachers and researchers during the co-design of their collaboration could interact with each other and progressively build the sense of their actions. Conversation between them becomes the privileged place in which to carry out an explicit negotiation and redefinition of shared values, learning how to become a recognised member

of one another's community. Being involved in a research process allows developing skills, approaches and strategies, which can positively influence the reflective capacity. Developing research-based teaching practices offers teachers an opportunity to acquire knowledge and skills to be directly applied in their approach, giving them a meaning that they then use to improve their decision-making (Cochran-Smith, 2005). The researcher in a co-design collaborative design research can play an intermediation role (Wenger, 2011), creating new connections between participants and between communities, opening new possibilities of meaning. Some of the assumptions developed in the specific scholastic setting could help scaffold researchers reach a higher level of understanding of practice situated in the cultural context (Inoue, 2010). Being intermediaries is not a simple role, considering that it requires the implementation of translation, coordination and alignment processes between perspectives, often playing on the subtle thread of ambivalence between the different practices. Other than the teacher community, other factors could influence this dynamic like ITC, the administration etc. This interprofessional collaboration must be based on shared and transparent expectations in a spirit of care, trust and connectedness. A representation between researcher, teacher, and students engaged in design activities is proposed as three main spaces, as seen in Fig. 5.1.

As a methodology, the narrative inquiry is a way of understanding and inquiring into the experience through "a collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus" (Clandinin & Connelly, 2000, p. 20).

Finally, the technologies can play a part in bridging space and time to facilitate collaborative design: "The activities of participatory design become activities of infrastructure, that is providing the resources necessary to prompt, support, and

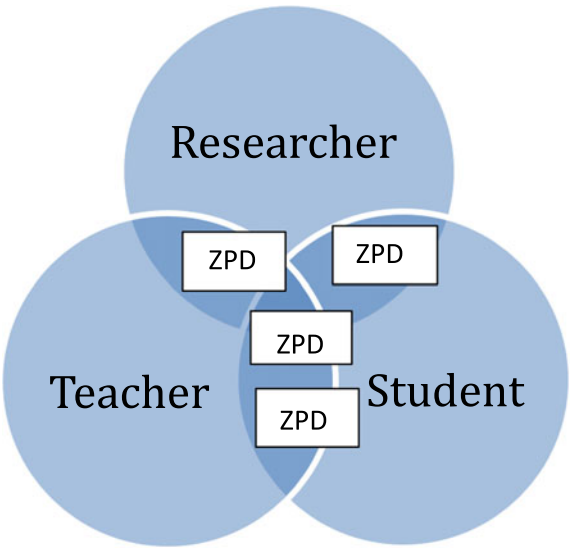

Fig. 5.1 Representations of interacting spaces or activity systems (Augustsson, 2020, p. 35)

sustain, this collective and collaborative inquiry through design (Disalvo & Disalvo, 2014, p. 795).

5.3 Collaborative Professional Learning Through Social Network

Networking is a crucial skill in professional careers, supporting the individual's growth and learning. However, little is known about how professionals intentionally manage the connections in their networks and which factors influence their decisions in connecting with others for learning (Fancera, 2019). An increasing number of teachers and teachers' educators participate in pedagogical discussions in various online professional communities worldwide (Rodesiler, 2015), which have also been widely expanding. Educational researchers have accordingly started to explore the impact of teachers' participation on social media and in online professional communities for professional learning. Indeed, the use of online professional communities is believed to have considerable potential for professional learning.

Participation and collaboration on social media enable teacher educators to discover, discuss and share methodologies, tools and solutions that have already been experimented with by peers. Networks are relationships, personal interactions and connections among individuals who share information and helpful resources and contribute to personal/professional growth; this project, facilitated in a digital environment. Communities are also spaces where learning can show their utmost potential, both for people and institutions. Online social areas also give opportunities to build bridges between formal and informal professional development (Impedovo et al., 2012).

In particular, as demonstrated by Ranieri's (2019) analysis, the main benefits of social media for lifelong learning and professional development are the sharing of resources and ideas, facilitating knowledge exchange by connecting communities of practice and building a support network including collaboration among communities of practitioners, feedback and mentorship. Simultaneously, the main challenges are associated with the risks to privacy deriving from personal data disclosure, which is an inherent characteristic of social media in general. One in-depth study has been conducted on Italian teachers' communities to understand the types of learning experiences that social media platforms such as Twitter and Facebook offer (see Manca & Ranieri, 2017). The authors show how social media and social networking sites are spaces in which to cultivate different forms of social capital, with implications for psychological well-being. The exchanges facilitate the coordination and cooperation for mutual benefit, as well as discussion of resources and personal and professional relationships. In some conditions, like an active epistemic engagement, a social network community can become a Community of Inquiry oriented to create a deep and meaningful (collaborative-constructivist) learning experience by developing three interdependent elements—social, cognitive and teaching presence. This

space of understanding can also be a space of tensions and frustration between them. Of course, many other elements influence this relationship, like the students, the institutions, the funding entity etc.

Finally, three points of recommendation show how it is possible to retrace about networking and professional developing:

a. Informal professional development via social networks can fill the gap in the increasing need for professional development, especially about new educational technology, playing as "third spaces".
b. The analysis of professional development via social networks and social media can help understand the evolution of professional development and the dynamics of co-building of information and knowledge.
c. Professional development via social media has to be scaffolded and supported to make a full appropriation of competences possible and introduce innovations from the online community to the local community (classroom and schools).

A Theoretical Focus: **Participative Methodologies** In the following, we discuss the qualitative research methodology:

– *Participatory Action Research (PAR)* is an option that involves a cyclic process of research, reflection and action (MacDonald, 2012). The main aim is to describe and understand the dynamic process. Thus, it is considered democratic, equitable, liberating and life-enhancing qualitative inquiry that remains distinct from other qualitative methods. Attwood (1997) explained this as: "the concept that people have a right to determine their development and recognise the need for local people to participate meaningfully in the process of analysing their solutions, over which they have (or share, as some would argue) power and control, to lead to sustainable development" (p. 2).

Participatory Action Research:

1. mobilises an approach in terms of the theory of the possible rather than the predictable helping to demystify research for the different participants;
2. must provide people belonging to communities with opportunities to integrate into research as actors in their history, expressing their individual and collective truths and realities;
3. must allow groups of people the freedom to explore and appreciate the way they experience their individual and collective realities. Most commonly cited methods in the literature for enacting the PAR are focus groups, participant observation and interviews.

– *Design-based research (DBR)* has developed in the community of researchers in the education sciences. The model considers the diversity of the learning and teaching contexts and the "messy" nature of it. Therefore,

if it leads to results that explain and predict learning in very confined situations, it does not guide a larger scale, transforming educational practices based on shared meanings.

– *Participatory Patterns Design (PPD)* provides a framework for engaging multidisciplinary communities in joint reflection on innovation (Cook et al., 2016). Design and development cycles lead educational practitioners and researchers to:

  - *Understand existing epistemic practices (i.e., public reasoning and adjudication);*
  - *Identify gaps in those practices;*
  - *Consider relevant theories as well as existing/previous attempts to address these gaps;*
  - *Conceptualise a novel solution;*
  - *Define the evaluation protocols for this solution.*

5.3.1 *From the Research:* Use of Social Network by the Teachers in the Global South

The quality of teacher educators' professional enhancement in different parts of the world (in this case, from Pakistan and Bhutan) could be nourished by the intense exchange of information and the growing rhizome-like expanding system (McIntyre, 2012) of connections between people, knowledge and communities. Understanding how to maximise the potential of connecting other communities of teacher educators, professionals and institutions via such media remain a significant challenge. Through active engagement on social media and in online professional communities, teacher educators can build active connections and facilitate beneficial learning and knowledge sharing.

Impedovo et al. (2019) examine teacher educators from two countries less represented in the educational literature. Pakistan and Bhutan are considered countries with growing educational technology usage, enabling them to offer specific perspectives in the global scenario. The three areas explored:

a. The digital media in teacher educators' practices: teacher educators' main social media applications are WhatsApp and Facebook. The use of social media responds to the acquisition of social capital, regarded as the set of current or future resources related to the possession of a durable network of more or less institutionalised relations of knowledge or mutual recognition (Bourdieu, 1972), whose value was recognised by the teachers in this study. Social networks like Facebook that were primarily conceived for socialisation have become oriented towards professional use; a phenomenon called professional

Facebooking (Manca & Ranieri, 2017). In both countries, email is used to exchange useful information and maintain social capital.

b. The appropriation of open educational resources (OER): the utility of free-access resources was acknowledged by teacher educators in both countries, who search and share on social networks. Larson and Murray (2008) argue that the most significant challenge for OER initiatives in the developing world is to provide effective OER delivery. The teacher educators highlighted the value of sharing: knowledge and skills have a social life that originates and can be distributed in social interactions, leading to collective learning. The more confident a teacher becomes, the more willing they are to collaborate and share their materials with their community.
c. participation in online communities: as regards collaboration and participation in online communities, the teacher educators declared that they seek to develop skills oriented towards content (new pedagogical methods) in Pakistan and processes in Bhutan (ICT skills and research tools).

Collaborative practices among teachers through a social network may become the precursor tool for restructuring ideas or experiences and the development of professionalism.

5.3.2 In Practice*: Relational Agency in Working Practices*

"Working Relationally in and across Practices" (Edwards, 2017) focus on three key concepts developed by Edwards: relational expertise, which Edwards defines as the capacity to interpret problems with others, sharing knowledge, which denotes knowing what matters for professionals in other practices, and relational agency, which involves using that shared knowledge to take action with others. Edwards has developed these concepts to shed light on collaboration across practice boundaries where practitioners with different forms of expertise work together on complex problems to provide a cultural-historical collaboration approach. Edwards developed three main themes: working relationally in the professions, in networks and research. Edwards mobilises the concepts of professional and professional expertise as something that is enacted relationally.

5.3.3 The Idea in Brief*: Toward an Epistemic Collaborative Communities*

Teachers' significant professional development highlights the salient aspects of collective and collaborative education contexts that structure mutual enrichment. Collaborative practices oriented to the exchange of resources and online knowledge, make it possible to connect at an interpersonal, group and cultural level,

including conversations with colleagues from the local community. Some of the cultural context assumptions could function to scaffold action researchers to reach a higher level of understanding of practice situated in the cultural context (Inoue, 2010). For example, the teachers of the so-called "Global South" would thus have the opportunity to share their unique perspective outside the Western view of mainstreaming, like Bhutan which embodies the concept of gross national happiness at all levels of education and teaching. Knowledge and knowing may be reduced to the logic of the market and deferring to broader anxieties about global economic competitiveness and positioning in the context of world rankings. Cross-cultural dialogues could lead to gaining epistemological flexibility and becoming better prepared for overcoming various problems of practice in a local context. There is a need to change the conventional vision of the teacher as a consumer of other people's knowledge.

Through active engagement on social media and in online professional communities, teacher educators can build active connections and facilitate beneficial learning and knowledge sharing. With active attention in social media and online professional organisations, the teacher makes connections and experiences a form of serendipitous learning and knowledge sharing (Saadatmand & Kumpulainen, 2013). This online engagement is also called "charting of collective knowledge" (Littlejohn & Hood, 2017), which helps the individual connect with the collective and improve their professional development, enabling them to connect with collective knowledge in the online community.

5.3.4 The Professional Insights: *To Uncover the Teachers' Experiences of Knowledge*

Talking about community raises the question about to merge different perspectives. The work of Saavedra (2011) shows the tension that occurs when one's work is not necessarily subscribed to the Western paradigms in an attempt to develop "border-thinking" (Mignolo, 2013), as thinking beyond the borders. An uncritical imitation of Western research paradigms within a scientific, intellectual activity (Chilisa, 2012, p. 7) dictates how theoretical structures, research questions, methods, results, and dissemination ought to be.

Castañeda-Londoño (2019) reports her experiences of "colonized being" by Western research paradigms: "Teacher-researchers in the Global South, like myself, are intending to develop new ways for us to build knowledge considering our peculiar contexts, with authors and perspectives that honour our origins, ideas, lived experiences, historical locations, emotions, and bodies" (p. 86). This has broad implications on methodology research. For example, the act of verbally sharing one's own experiences with other people is pivotal, where knowing with others takes prevalence over knowing about others (Sousa-Santos, 2018), with a new role given to the listening practices.

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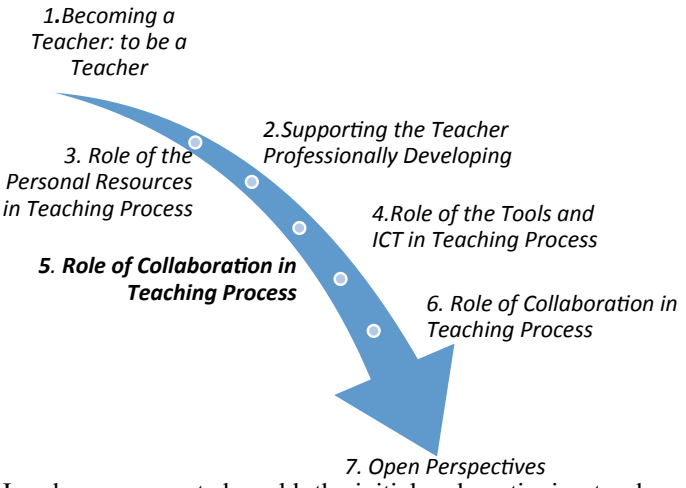
Chapter 6
International and Global Professional Developing

Abstract The chapter stresses the profound transformation undergoing of the educational system for teacher education in many countries. Teacher education is discussed, focusing on the role that the teacher educators could play for the next generation of teachers. An example of a Capacity Building project for teacher educators has shown the potentiality of blended learning for international teacher communities. In the same time, it is essential to question the sustainability of competencies in the indigen context for a so-called "ethical-critical global pedagogy" open to conversation and dialogue.

Keywords International · Sustainability · Global pedagogy



In a hyper-connected world, the initial and continuing teacher education proposed by higher institutions remains somewhat limited to national borders. Globalisation is defined by Goodwin (2020) as "the intersection of and connections across countries, the blending and blurring of borders, the mutuality of their trajectories resulting from the intertwining of economies and cultures, and the trade-in ideas (and ideologies), practices, technologies, and people" (pp. 2–3). Teacher professionalism needs to meet

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the emerging challenge of increased openness and cross-institutional collaboration, both formal and informal, among institutions and practitioners.

The chapter stresses the profound transformation in the educational system for teacher education in many countries. Teacher education is discussed, focusing on the role that the teacher educators could play for the next generation of teachers. An example of a Capacity Building project for teacher educators has shown the potentiality of blended learning for international teacher communities. At the same time, it is important to question the sustainability of competencies in the indigenous context for a so-called "ethical-critical global pedagogy" open to conversation and dialogue.

6.1 International Teacher Education

The teacher is still in the classroom, but professionalism is part of an inextricably local and global interconnected network. The rapid spreading of COVID-19 into the world shows the inevitable crossing of multiple networks and, at the same time, the global sharing of tensions and fears. The globalisation shows the need for a shared and international perspective on teacher professionalism.

Globalisation has brought an increase of internationalisation of education. International courses are characterised by cultural plurality and great potential for professional teacher learning: it can support teachers' professional growth, promote transformational learning and do explicit cultural discursive practices (Oolbekkink-Marchand et al., 2017). However, these international programmes could also be fraught with a predominant one-way perspective and a limited knowledge about local resources, opportunities and constraints. Biesta (2017, p. 440) affirms that the current and crucial educational questions should be "not child-centred, not curriculum-centred, also not competence-centred, or skills-centred but world-centred".

For this, the teacher must be exposed to innovative education, with an international and intercultural perspective. Quality of teacher-educators' education in different parts of the world could take advantage of a continuous connection between people, knowledge and communities, opening new discussions and valorising contextual educational experiences outside Western mainstreaming in teaching and learning. The benefit of virtual and in presence mobility could help understand the diverse learning needs, linked to a context, together with an intercultural development.

The global competencies include the capacity to understand others and different cultures and appreciate such differences and world views. The concept of "Object-oriented intercultural understanding" emphasises the necessity of constructing a shared object to achieve sustainable intercultural understanding. This conceptualisation of intercultural understanding leads to embracing cultures and communities.

6.2 Teacher Educators: Toward the Next Generation of Teachers

Education reforms are applied worldwide in highly diverse countries in cultural and economic terms, giving rise to what some researchers define as 'global education policies' (Verger et al., 2012, p. 3). In Europe, the need to improve teacher education is supported by the European Union (EU) program's policy initiatives. Specifically, the Lisbon Strategy launch in the year 2000 has led to an accelerating process of Europeanisation. The idea of the European Teacher Education Area (Gassner et al., 2010) and the European teacher (Schratz, 2014) emerges from the European and national policies related to teachers and teacher education.

A central role in teacher education is given to teacher educators, a particular group of professionals with specific responsibilities, expertise and commitments in their respective educational systems (Swennen & White, 2020). The term 'teacher educator' covers a mixed and diverse group of professionals and is perceived differently across countries (Murray et al., 2019). The development of their expertise constitutes a critical issue, considering their modelling role in technological and pedagogical innovation. The specific field is 'under-researched', and teacher educators remain 'hidden professionals' because of the identities they construct for themselves and the institutional settings in which they work (Livingston, 2014).

Recently, there is an international trend towards defining teacher educators' role and competencies (Swennen & White, 2020).

A Theoretical Focus: Blended Learning Over the last decade, blended learning (BL) has become one of the more widely used instructional approaches proposed by higher education for initial and continuing education. This method enhances the potential benefits of both face-to-face and online strategies for participants and educators in effective and flexible communication and collaboration adapted for adult education. Despite this variety of potential, the adoption of BL for international education is still in the starting phase. In their review of BL worldwide, Spring and Graham (2017) report that there is a lack of connection between countries and regions in the educational literature. Yet, the potential of BL in developing countries has not been well explored. The BL approach could be suitable for introducing innovation and international-related added value for international teacher learning.

The COVID-19 crises have widely spread blended learning, explored in the educational literature from the students and the teachers' side. Some examples are about the teacher beliefs as they adopt online and BL modes (e.g. Tondeur et al., 2017), with a recent focus on identity (e.g. Howard, 2020).

6.2.1 From the Research: *An International Blended Course for Teacher Educators*

The BLTeae Project (no: 574130-EPP-1-2016-1-FR-EPPKA2-CBHE-JP) was supported by the European Commission's Erasmus + programme within the 'Capacity-Building higher education' category, which aims to address the challenges that institutions and higher education systems are facing. The BLTeae project was led by the School of Education, Aix-Marseille University in France. The University established the consortium involving four institutions in Europe (Aix-Marseille University in France; Aalborg University in Denmark; Tallinn University in Estonia; and ATiT in Belgium) and seven institutions in Asia (the Royal University of Bhutan in Bhutan; Universiti Teknologi MARA and Pendidikan Guru Institute in Malaysia; the University of Dhaka and Bangladesh Open University in Bangladesh; National University of Modern Languages and International Islamic University in Pakistan). This project responded to a common issue in European and Asian Educators' Professional Development. Such a dimension can benefit from international reflection (also where digital resources mediate it) when aimed at the development of didactic, linguistic and intercultural competencies (Impedovo & Brandt-Pommares, 2018).

The project began in practice with its first meeting in January 2017; it was structured over three years. A website (http://blteae.eu/) and a Twitter account have been created to support the community's communication. A specific technological equipment budget was allocated for each Asian institution.

In the first year of the project (2016–2017), a specific needs analysis was carried out. A questionnaire was developed and distributed to the international community to determine the teacher-educators' skills involved in the project. All the institutions were engaged in developing pedagogical and information and communication technology content courses in the Moodle platform.

In the second year (2017–2018), the project focused on sharing teachers' practices in the online and face-to-face communities. Two face-to-face international education workshops on the online resources conducted in Bangladesh and subsequently in Pakistan were developed to facilitate collaborative learning based on BLTeae's innovative modules. The emphasis was placed on the production of videos on teaching practices related to the modules' contents. Teachers were invited to record short videos in the classroom about their teaching practices. In small snippets, these videos were made available on the online platform for sharing and discussion. Besides this, the teachers shared and discussed other videos of teacher trainers in the community.

In the third year (2018–2019), the goal was to write a common framework for teacher educators' professional development. Each country has shared the national referential skills for teachers and teacher-educators. The competencies are discussed collaboratively to find the main common areas for possible improvement (taking into account individual countries' perspective). A schema in Fig. 6.1.

The international cooperation was reification in the online sharing; the appropriation of innovative pedagogical practices through the mediation of technology (for the analysis of one pedagogical module, see Chatoney et al., 2019). What makes this

Fig. 6.1 Three-year activities in the BLTeae project

project innovative is not necessarily the technologies that have been implemented but rather the focus on real, large-scale collaborative cross-border practices.

Two challenges faced in the project were:

a. Intercultural awareness and European administration formality: the project has a robust intercultural specificity. Several activities were arranged to minimise the cultural differences among members, especially during each face-to-face project meeting. The project thus fostered opportunities for transnational collaboration (Impedovo & Ginestie, 2020), as shown in extract 1:

Extract 1
Asian teacher-educators

The training has allowed [us to] share common goal[s], common difficulties and common reflections that will help each institution move forward. The sharing of issues and problems faced by different teachers was beneficial for me as I learned almost all people have to face challenges, and I should not give up implementing new trends.

Regarding connectivity and technological gap between partners, connectivity issues were encountered during online video conferencing due to Internet stability. Some challenges were also faced due to blended learning being a relatively new concept for higher education institutions in Asia (Tham & Tham, 2013). Below is an extract by a European teacher about the Bangladesh training (Extract 2):

Extract 2
Bangladesh teacher-educators

I conducted several online workshops in Bangladesh, where one of the colleagues in the University of Dhaka or Open University, Dhaka, facilitated the participants. I guided them

through the activity. Many of the participants even need help in verifying their account by going to their mailbox. Many colleagues' work culture does not include routine email checking, let alone the habit of going online for attending a course. So, this process of Blending enabled gaining access to learning content and easily learning basic technologies.

These reflections show the need to discuss intercultural computer support and collaborative learning. It opens a discussion also about the cultural appropriation of the new technology tools. In digital literacy, the debate arises about the contextual appropriation of ITC, like the users' representations about the digital tools; the skills and the habits to appropriate and link to the contextual social and cultural rules. Below is another example, an extract from an interview (Extract 3):

Extract 3
Pakistan teacher-educators

Suppose you utilise technological tools that give the students a lot of autonomy to the detriment of the authoritative professor's position. In that case, I think it is quite common in the Scandinavian countries, but such tools will be less relevant in Pakistan or Bangladesh. But you need to know the tool and adapt it.

6.2.2 In Practice*: Sustainability of Competencies in the Indigen Context*

Sustainability process could provide an insight into what happens during the implementation that fosters sustainability. Indeed, teachers could introduce new practices in significantly different ways, often grafting new approaches on top of existing rules without altering classroom routines. Research on skills sustainability usually focuses on the factors that facilitate or impede sustainability—like the type and amount of support, experience with the practices, teachers' characteristics and beliefs, and the perceived fit of the new ways with the given context (Bambara et al., 2009). A significant change is necessary, altering instruction, beliefs about teaching and learning, and pedagogical practice for stable growth in personal and collective ways.

The paper by Impedovo and Ferreira-Meyers (2019) investigates how research-based teaching practices are sustained after completing a Master course to develop skills in research education. Data is collected from teachers at the end of a Master course and one year later. We interviewed a class of seven in-service teachers (six men and one woman). These teachers attended a two-year full-time international Erasmus Mundus Joint Master's Degree on Educational Research (co-leaded by Belgium and French University). This Master's course aimed to improve teaching skills in science education research and develop a positive research attitude. The teachers were from three African countries (three from Namibia, one from Lesotho, two from Zimbabwe) and one from Vanuatu. The data collected are participants' narrative accounts about their research practices, first, at the end of the Master's course, when the participants had already finished their education course and were ready to return to their respective countries. We then collected data again, one year after the end

of the Master's course. Individual semi-structured interviews were conducted via Skype. The temporal dimension helped us to see the impact of the Master's course, in general, and the use of research-based teaching practices in particular, over time.

From the results, it appears that, despite possible contingent difficulties, teachers express the will, motivation and desire to use research-based teaching practices to improve their teaching practices, with direct and indirect influences on their classroom, school and community, and personal career. It emerges a more oriented identity as practitioner-researchers (Swennen,2018). Central to this participation is the individual's willingness to develop and transform their skills continually.

6.2.3 *The Idea in Brief:* Ethical-Critical Global Pedagogy

The quality of teachers' education could be nourished by the intense exchange of information and the growing system of people, knowledge and communities' through the technology. The so-called "Ethical-critical global pedagogy" aims to foster and promote not only skills but, most importantly, also values and actions (Bosio, 2018). A discussion about global pedagogy opens the attention to the "Schooling process", mainly linked to the so-called Global South. The trainers of the so-called "Global South" would thus have the opportunity to share their particular perspective outside the Western view of mainstreaming and bring new perspectives like Bhutan which embodies the concept of gross national happiness at all education levels and teaching. Knowledge and knowing may be reduced to the logic of the market and deferring to broader anxieties about global economic competitiveness and positioning in the context of world rankings (Mignolo, 2013). Cross-cultural dialogues could lead to gaining epistemological flexibility and becoming better prepared for overcoming various practice problems in a local context.

6.2.4 *Professional Insight:* Conversational Professional Developing

With this concept, the role of conversation to join in a community of discourse is stressed (Sfard, 2019) where meta-level learning is proposed to transform what is done. Sfard reflects the "incommensurable" inside two addresses and the need for real collaboration to help the other deal with a different perspective based on different bases. According to the authors, "defining traits of dialogue were, first, the presence of more than one discourse, thus the constant possibility of incommensurability; and second, the fact that dialogue is always geared toward easing the predicament of discursive divides, and not necessarily by their removal" (p. 7). In line with the multivocality proposed by Bakhtin (1986), "entering a dialogic encounter means opening oneself to this unknown Other, celebrating alterity, and treating the Other

as an indecomposable whole that, in the process of constant transformation, can transform us as well" (p. 7). Sfard talks of dialogic engagement to point to the always open possibility of incommensurability between the interlocutor's discourses. This means to be able to figure out the "inner logic" of the interlocutor's speech to make evident the invisible fundamental way to see that of the others. Interlocutors from different backgrounds have to build a "discursive space"—the space of discourses in which the person can (or not) decide to participate.

In sum, according to the Sfard, to be dialogically engaged in a conversation means that this person:

1. actively examines the possibility of incommensurability between her discourse and that of the other participant;
2. acts as an aspiring participant of the other person's address;
3. acts as if she was a participant of the other discourse.

Finally, the teacher and researcher collaboration have not to be hierarchically structured. Indeed, according to Matusov and Pease-Alvarez (2020), a vital feature of a collaborative approach and an essential aspect of critical dialoguing is its horizontal organisation. Teachers and researchers have to engage in predominantly horizontally-oriented interactions where they fluidly share roles and responsibilities in each other's learning: "you can't order people to collaborate. Indeed, in critical dialogue, it does not need to be perceived in the same way by all the participants" (Matusov, 1999). Instead, all participants should recognise their interests in the problem as necessary, even though they may disagree with how they have to be addressed. For this, they stress the importance to move from collaboration to critical dialogue in action.

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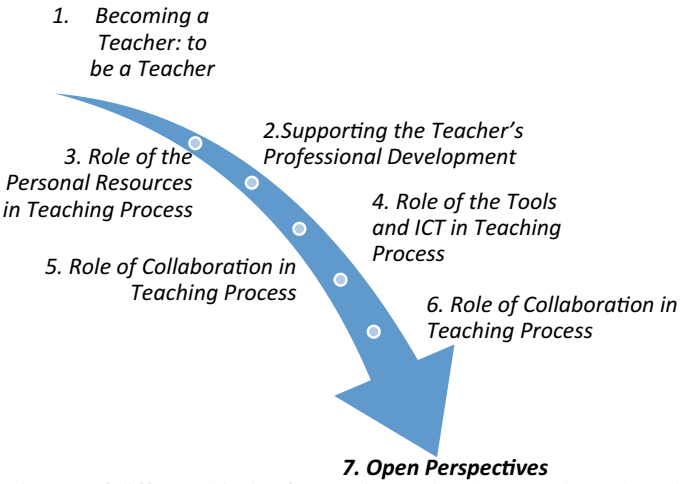
Chapter 7
Open Perspectives

Abstract The chapter invites the readers to open a discussion on the implication of emergent technology—like virtual reality, robotics and augmented reality- on teacher practices in the classroom on a practical level and a broader impact on professional development. In current educational literature, points of discussion are explored toward a posthuman teacher professional development, moving toward critical and participative mean-making in trouble time.

Keywords Emergent technology, robotics · Mean-making · Trouble time



The use of different kinds of emerging technology, such as Virtual/Augmented/Mixed Reality, Sensory Augmentation Technologies, Artificial Intelligence and Robotics, requires a form of adaptation to the available resources, making explicit the reference to them. The interaction with the new technology is lived no longer as an experience in itself, preferably based on the frame of social meanings in which each individual can place it. In this sense, learning and interactions are extensively transformed when integrating emerging technologies. Learning, therefore, becomes a becoming with and through technology.

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According to Valsiner (2014), social interactions involve personal meaning-making processes in coordinated actions within the framework of social norms negotiation. So, teachers are engaged in a continuous form of meaning-making, from the micro-genetic level of child/teacher interaction to the macro-level of social discourse. The introduction of new and emergent technology in education introduces a recent change in space, time, resources and social interaction. In this chapter, some discussion points in current educational literature are also explored in a visual and graphical modality, to open space for debate. Some discussion points in current educational literature are also explored toward a posthumanist/hyper human teacher professional development, considering the need for critical and participative mean-making in trouble time.

7.1 Knots of New Configurations in Classroom

Technologies act '…as active interventions and transformative forces within the world' (Stetsenko, 2017, p. 30). The everyday meaning of the term 'technology' has morphed so quickly in recent years that it has become virtually synonymous with the digital technologies that are globally transforming human life patterns. Gleick (2000) referred to this as 'the acceleration of everything': media and devices are now an integral part of daily life (Global Internet Use Report, 2019). Emergent and exponential technologies like Virtual/Augmented/Mixed Reality, Sensory Augmentation Technologies, Artificial Intelligence and Robotics will soon be widely spread in our daily lives. As proposed by Pacansky-Brock (2017):

> professors are encouraged, inspired, and incentivized to teach with emerging technologies, the playing field will shift, and college will play a formative role in mastering necessary 21st-century skills and encouraging students to develop a credible digital footprint. (p. 76)

Learning activities like Virtual/Augmented/Mixed Reality, Sensory Augmentation Technologies, Artificial Intelligence and Robotics engage participants in a new embodied activation, mobilising physical and virtual engagement, spaces and resources. Here, it is possible to metaphorically term the strict connotation between virtual and material as "knots" to show the interweaving of the aspects considered: human body versus cyber or robotics; material versus online resources and tools; space and time; new configurations. In the following section, we explore knots of hybridity. In Table 7.1, some examples of hybridity that need to be considered in instructional design with emergent technologies are detailed:

Table 7.1 Hybridity

Hybridity of body	Embodied interaction claims that any action is constituted by a complex arrangement of multiple semiotic fields (e.g., gestures, the body, the language) that are deployed simultaneously and influence each other. So, human activity can be understood through the contextualised experience of a body-environment system, and not as the result of representations of the world disconnected from a context (Goodwin, 2000). Therefore, it is challenging to determine how the body enters into the real and virtual setting contextual configurations and how the body gain their significance about the activity. Also, the body needs to be differently communicated in this 'hybrid' setting of virtual and real, opening a multi-activity interpretation (Mondada, 2019). Bodies, language and objects are combined in the production of actions as well as in their interpretation (Mondada, 2019)
Hybridity of tools	The concepts of mediation (Vygotsky, 1986), artefact (Wartofsky, 1973) and so-called "ba" (Nonaka & Konno, 1998) help in investigating how aspects of context impact human thinking. According to the socio-constructivist approach, people interactively construct the realities in which they live, developing symbolic, sense-filled "possible worlds." At the same time, they act in their physical, social and cultural environment. Part of this continuous construction process occurs when people negotiate the contexts in which interact while participating in various activities. The virtual or augmented dimension adds a new level to the physical one that mediates the virtual and the real one
Hybridity of language	Virtual/Augmented/Mixed Reality, Sensory Augmentation Technologies, Artificial Intelligence, Robotics introduce an extra dimension that puts a new non-linguistic, bodily and visually learning extent at the centre of users' experience, removing language from the dominant vector of the experience. The term interaction indicates the complex construction of meaning that human beings do in acting in space and time (Duranti & Goodwin, 1992), simulated or not. It is a continuous attempt to clarify the activity and the intersubjective understanding between the virtual and material process (Kosmas et al., 2019)
The hybridity of space and time	The space-time of interactions is here conceptualised in terms of the heterotopia (a place where many layers of material, symbolic, virtual space overlap and alternate—Foucault, 1967) and chronotope (patterns of organisation of space and time)

7.2 Task: Negotiated Activity Between Teacher, Students and Emergent Technology

The task is a central activity of the learning process, in the interaction between the presage and the product in Biggs' model (2003). In this model, what the learner does

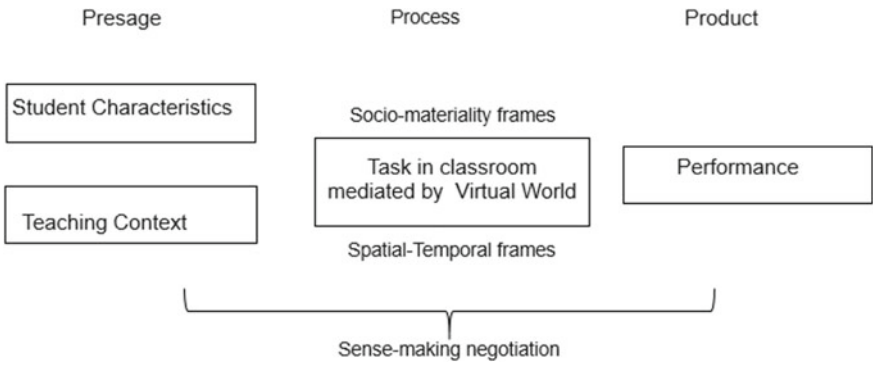

Fig. 7.1 Adaptation of Biggs (2003) applied to virtual reality

during the process is the 'constructive' aspect to construct meaning through relevant learning activities. Teachers and students are involved in continuing explanations and interpretations of tasks in the learning environment. The activity, mediated by new technology, is negotiated discursively between the teacher and students: the space-time is extended by the virtual reality (here in the classroom versus there in the virtual environment). The context construction is shaped in line with the objectives and the activities between virtual and material presence.

For example, virtual reality introduces and could transform teaching practices with new modality and an extended simulated setting. In this perspective, the teaching and learning contexts emerge from a continuous process of social negotiation. In Fig. 7.1, an adaptation of Biggs' model (2003) can be seen:

Virtually mediated reality introduces a state of immersion based on being, to occupy the space and time, the here and now, in a virtual present separate from the real space. To describe this ambiguous level of interaction with artefacts, body and space/time configuration led by the introduction of virtual reality, we could adopt the metaphor of liminal learning, the phenomena of being "betwixt and between" (Turner, 1967). Considering the cognition is distributed and some conceptual blends are constructed publicly in interaction and anchored by the material world, "liminal blends" (Enyedy et al., 2015) become some in-between space from which students can reason and generate new inferences.

In Gadille and Impedovo (2020) paper, the context of activity is a social construction in the Virtual World. Learning activities engage participants, which mobilise physical and symbolic spaces and resources. The virtual environment is a communicative context in which the user enters in a reconstructed context and interacts with a peer. The term interaction indicates the complex construction of meaning that human beings do in acting in a space, be it simulated or not. It became interesting to examine how the participant makes sense of their environment and learning activity between real and virtual settings, discursively negotiated in space and time dimension, and mobilises symbolic and material resources.

Being aware of these implications could help design learning tasks with new technology, enabling the complex orchestration between online and virtual resources, modality, embodiment, epistemic and space-time dimensions involved that are intertwined with each other. So, it will be a teacher's competence to discursively weave together the real and virtual learning and teaching settings.

Theoretical focus: Teacher Professional Development in Post-humanism/Hyper-humanism Postmodernism perspectives invite teachers to take ownership of the different forms of reading and interpretation of reality, questioning Western philosophical and scientific tradition (Fiore, 2019; Hayles, 2010, 2012). Postmodernism feeds new reflections on the professional dimension, becoming an open space for debate not yet built. Pushing more, for example, terminology like Post-humanism (meaning "after humanism" or "beyond humanism") opens a new definition of humanity (Ferrando, 2019). Post-humanism explores new cognition, perception and developmental awareness implication (Belhassein et al., 2019) in a living era so-called "Anthropocentrism" (as the belief that human beings are the most important entity in the universe); artificial intelligence (A.I), robots and ethical technology, genetic privacy, technological addiction, environmental sustainability, power, equity etc.

The philosopher Ferrando (2019) considers at least seven definitions:

- Antihumanism is critical of traditional humanism and traditional ideas about humanity.
- Cultural posthumanism is oriented to adapt to technoscientific knowledge.
- Philosophical posthumanism is focused on ethics implications.
- The posthuman condition is oriented to discuss the deconstruction of the human state.
- Transhumanism is projected to eliminate ageing, enable immortality and greatly enhance human intellectual, physical and psychological capacities.
- Artificial Intelligence takeover discusses the replacement of some forms of human works by artificial intelligence.
- Voluntary Human Extinction discusses a future without humans.

Indeed, humanity deals with urgent issues such as artificial intelligence, environmental sustainability and equity issues that need to be questioned. Let's consider the technology, for example. The deep and strong connection with technology can help a new human-tech hybrid emerge (Duus et al., 2018), with darker sides still to discover.

Utopian and dystopian, visionary and critical and theoretical and practical approaches including philosophical, critical and cultural posthumanism, transhumanism, new materialism, anti-humanism, object-oriented ontology, meta-humanism, panpsychism and other methods have to be considered and listened to in our relationship with the world and technology.

Exploring the relationship between humans and technology could mean adopting:

a. An interdisciplinary perspective to understand awareness and the emerging of transformative human agency in interaction with new technology in posthumanism;
b. The rehabilitation of the materiality dimension in which we live;
c. The inclusion of postmodern theoretical and postmodern methodological perspectives in a non-dual reality focus on how matter matters as agentic and intra-active;
d. Development of powerful human-centric hybrid literacy to address cultural diversity issues and social inequality in posthumanism for all, moving from a content-based economy to a context-based economy.

7.2.1 From the (Future) Research*: Uber Teacher, Click Education and Robot*

This title would propose some scenario about the teacher in the coming future. However, it is not so imaginary. Indeed, there has already been some service of on-demand mobile services for quick and fix solutions developed in education. Uber is a well-known society for mobility. Since 2009, Uber has grown into a $70B company, offering its services in over 600 cities across six continents. Uber-like models in education is an already explored market. In the UK, a service called Uber Education works as "a networking solution bringing schools and teachers together utilising a rating system which enables schools to source the best supply teachers who have total control over their earnings" (source: website). Another example is 51 Talk in the U.S., an online platform connecting educators with Chinese students who want to learn English. However, it is realistic to consider that some contexts dealing with a teacher shortage could be seduced by the algorithmic logic, matching experienced tech professionals with students.

Social networks such as Uber have achieved growing success in disrupting marketing fields, such as food delivery. The educational area is considered more stagnant and self-centred in the traditional vision of reputations and brands. The application of the on-demand model in education deals with the complexity of the activities, the affective and relational dimension involved and other implications like institutional resistance, with a limited 24/7 coverage. Still, some educational tasks, like the assessment, are more easily codified with standards. A specific discourse could be done for tutoring and mentoring, such as services like Tutorz.com, TutorVista, Wyzant and Studyroom. For example, PeerUp operates on university-campus specific environments, matching an available tutor with the student in a personalised service of matching.

Broadly, according to the Artificial Intelligence Market in the US Education Sector report, artificial intelligence in U.S. Education will grow by 47.5% from 2017 to 2021. Teachers and AI are already in collaboration to help develop skills and testing systems. Some examples are the Content Technologies and Carnegie Learning for differentiated and individualised learning or Translator as a free plug-in for PowerPoint to overcome linguistic barriers. The field is oriented to automate admin tasks, and new solutions are coming. The claim is to leave the management of personalisation and standardised tasks to the AI, allowing the teachers to focus on the delicate side of the relationship, in understanding and adaptability. A positivist vision claims a hand in hand relationship between AI and education, oriented to the best for the students.

The Covid-19 pandemic has shown how the application, the platform and tech solutionism model the teaching and the learning. The global request of ITC solutions to address the emergence will shape future directions to drive AI in education.

Moreover, an intrusive presence in the classroom ready to rob from the teacher the students' attention is the humanoid robot. The exciting idea to interact with the robot is quickly regulated by the related ethical concerns such as privacy, attachment, deception and loss of human contact, and control and accountability. According to the international European survey Special Eurobarometer (2012), 34% believe robots should be banned in education. Sharkey (2016) analyses four scenarios of a robot in the classroom, searching for a beneficial educational experience that the robot adds that might otherwise not be available:

1. the robot as a classroom teacher as the furthest from a realistic perspective due to the complex role of human actions and social interactions;
2. the robot as companion and peer;
3. the robot as a care-eliciting companion, to encourage children to teach it new concepts or skills (thereby reinforcing their learning). In this case, the robots can provide an individualistic practice, like multiple repetitions of the same information; and
4. the telepresence of a robot teacher that can be used, for example, to brings specific teaching expertise in a marginalised or isolated geographical area. Edwards et al. (2016) examined college students' perceptions about two robots: a human teacher operating a telepresence robot and an autonomous social robot teaching and their learning outcomes. A teacher as a robot and a robot as a teacher was rated as "credible" by students, with a preference for the teacher as a robot, considered as authorial sources. The robot as a teacher reported a potential influence behaviour change.

The teacher could be confronted with a redefinition of the role and task due to the AI, robots and digital implications. In light of the legitimate chance that the AI will introduce in education, we consider that the teacher's human side will be urgently required to develop a 'knowing-caring' attitude in an attempt to understand students and offer a model of learning and life.

7.2.2 *In the Practices: Teacher in Troubling Time*

As seen with recent experiences in different parts of the world, the school is often the centre of crises linked to the actuality, such as violent attacks due to terrorism or suicidal attempts or environmental or social disasters.

In the current year (2020), teachers around the world are experiencing crises due to Covid-19. In different countries, the sanitary conditions forced teachers to spend time at home or isolated in the classroom, delivering teaching through an online learning platform such as video conferencing systems. As well as changes in the curriculum program, instructional design modality and daily teaching practices, teachers have to deal, like many professionals, with new emotional stress and sometimes also new social arrangements and spatial configurations in the family environment. Indeed, a crisis causes some change in the role to perform and assume and a necessary adaptation to the situation, in material, social and cognitive forms, not always supported by conscious and explicit assumptions. The teacher's body as the locus of authority, emotional reactions, and non-verbal communications carefully adjusted to the classroom environment and the student's communication have been redefined by the technological mediation (video and chat). According to Moore's "transactional distance" theory, the essential distance in distance education became the activity and not the spatial and temporal dimension, focusing on constructs of structure and dialogue to mediate learning and teaching. The model can be adopted as an analytical framework to review teachers' work in an online setting like that proposed by Ryan and Loose (2020):

> In this model, teachers *recognize* students' needs and *refine* instruction, *reflect* on lesson structure, and in review, *react* by adapting and modifying practices. Through these actions, we see results that demonstrate how we moved our practice. (p. 33)

In these troubling times, the teacher's invitation is to stay with the trouble by 'learning to be truly present' (Haraway, 2016, p. 1). It means to develop a better connection with the reality, dealing with crises situation in a propositive attitude. One strategy to adopt is 'the arts of noticing' by Anna Tsing (2015, pp. 17–25), open to a reflexive approach to bring awareness to emotional transitions and cognitive restructuration before the action.

7.2.3 The Idea in Brief*: Critical and Participative Mean-Making*

As Matusov (2020) discussed, in conventional schools, students are positioned to enact ready-made knowledge and skills on the teacher's demand based on their pattern-recognition and reproduction, rather than being authors of their education,

learning, experience and meaning. In contrast, according to Bakhtin, meaning-making is defined as the relationship between a genuine, interested, information-seeking question and a serious response to it. From the Bakhtinian dialogic perspective, a statement does not have any meaning until it is viewed as a reply to some problem in internally persuasive discourse. A student's meaning-making process starts with a genuine, interested, information-seeking question raised by the student. At least, when a student cannot yet formulate this open question, they have to be pregnant with such a problem, experiencing a certain uneasiness, curiosity and tension. Also, technology can support unhinged old patterns of discourse and a direct new form of meaning-making.

7.2.4 Professional Insight: *The Diffractive Teacher*

Murris (2020) developed the idea of a diffractive posthuman educator. In her works, she discusses the diffractive teacher's concept as a disruptive system that disrupts the traditional separation of nature/culture binary and monological notions of the self. To give a visual example, Murris (2020) suggests a picture of a heron as a homology of the teacher: both the teacher and heron are doing the same, causing diffraction patterns around them.

A suitable postcolonial future school needs to disrupt misogyny, racism, human exceptionalism and age-discrimination, a new path of reflections. In this way, it is possible to project a "justice-to-come" (Barad, 2012, p. 81). This goal would be possible also through a human and more-than-human capacity of mutual empowering (Haraway, 2016). The diffractive teacher will be oriented to produce new thoughts and ideas in a diffractive approach strongly materialised:

> Importantly, the diffractive teacher can be human, nonhuman or more-than-human, contributing to a reconfiguration of the world in all its materiality – a process of "worlding." Importantly, this process is always relational, not individual. The heron's standing in the water is made possible by the water, the river, the people who maintain it, the mountains, the people who pay taxes, the heron's mother who gave birth to him/her, environmental laws and rules of the city, animal protection agencies, other species, global politics of climate change and sustainability and so forth. All are intra-acting with one another and with me who took the photo. Like the diffraction pattern caused by the heron's body, the relationship between the human and more-than-human is dynamic and has agency. (Murris, 2020, p. 21)

In conclusion, teacher professional development is a proteiform learning dynamic shaped by multiple influences from the personal story to daily contextual interaction towards an open directionality of the experiences.

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Chapter 8
Commentary: The Horizon Worker

Abstract In this chapter, the idea of teacher as horizon worker is developed. The process of teaching-learning, as any human developmental process, takes place in between the past state of affairs and the yet unformed future state. The educational intervention works exactly on this moving horizon, which requires a nomadic teacher, able to move with it. This idea challenges the current vision of teacher professional development as the acquisition of functional technical skills.

Keywords Teacher professional identity · Values · Human development

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The teacher is a horizon worker. The teacher accompanies the moving horizon of the other's development and thus cannot help moving along the horizon line herself. Yet, moving towards the horizon line, which is not a fixed point in the space-time but is a conventional limit that changes in time, the teacher herself is a person on the move. The teacher acts with another developing individual, within the context of the activity of social structured teaching-learning in a constant nomadic effort, whose direction is determined by several factors.

One cannot follow a moving line from a static position. Thus, the teacher is a horizon worker in a twofold sense: by accompanying the horizon of the other's development is also moving her own horizon. By assumption, instead, the formal educational process implies that the student *must* change over time (Tateo, 2018) while the institution remains static. It pretends that the teacher is not changing along with the learner. When it comes to the teacher training, the formation of the teacher's professional identity is understood as a process that leads to certain accomplished objectives and in which the only required change can be that of updating some professional competences. In this sense, the idea of teacher professional development is limited to the updating of the toolbox in relation to the changing nature of school organization and of the techno-economic resources. The teacher's professional identity is instead an open dialogical process that also unfolds over time (Tateo, 2012). Like any

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developmental process, it occurs in the space between what is already structured and what is not yet formed. Thus, any educational intervention takes place on the edge of the temporal unfolding of human development (Valsiner & van der Veer, 2014). In this process, something new is created, but also something old is partially demolished: teaching-learning as a developmental process is potentially revolutionary.

The goal of any formal education is to bring the learner from an acknowledged state "A" to a desirable state "B" within a proper spatial-temporal range. Yet, when one assesses the condition of the learner both in the state "A" at T_0 and in "B" at T_1, exactly the movement of the developmental horizon in itself is lost. This is a long-known problem in the study of human development (Valsiner & van der Veer, 2014) that has neither found a proper theoretical and empirical solution, nor it has been included into the field of teacher professional development yet. Any effective educational intervention takes place in the space in-between the existing state-of-affairs (what is already achieved) and the desired future-state (what is ought to be achieved), but also in between the self and the other. Maria Impedovo, in her valuable volume, discusses this paradox in several different ways. She points at the many horizons of the teacher in training: between the past and the future; between the self and the other; between the theory and the practice; representing the formation of the teacher as a never-ending process.

Working on the edge, a teacher can embody different functions: a mediator; a mentor; a gatekeeper; a guide; a smuggler; a diplomat; a repeater; an interpreter; an explorer; and maybe, sometimes, even a spy. All the professions taking place on the edge share the feature of being both the point of connection and distinction between two sides of a border inside and outside the school (Espanol et al., 2018). If the border is a moving horizon, then the profession becomes nomadic. Impedovo acknowledges such a nomadic nature of the contemporary teacher's professionalism in many ways. The teacher professional development can be understood as the crossing of several temporal borders, in which crucial experiences, such as the teacher's stage period, allow the reflective process of personal transformation. The teacher professional identity is grounded on several dimensions: the personal biography, the practice and the organizational culture (Tateo, 2012). They correspond to the dimensions that any process of education involves in the life-course: (a) the construction of cognitive structures; (b) the construction of knowledge; and (c) the forms of collective organization of teaching-learning. Every culture sets some parameters, embedded in the formal curriculum, to define the proper timing and pace of: (a) the age in which learners are ready to learn something; (b) the type of knowledge that is appropriate to a certain age or life-stage; and (c) the correct forms of organizing the teaching-learning activities. Every culture finds its way to solve the problem of how to raise, socialize and educate its offspring, based on the local system of values (Tateo, 2020). Such local solutions to the problem of teaching-learning are taken for granted until some special event is not questioning the usual way of doing. Under special conditions, such as the school lockdown during the Covid-19 pandemic, one can begin to discuss whether classroom presence is crucial for a proper development of children or can be fully replaced by e-learning. The pandemic proved that our Western assumptions about (a), (b) and (c) are not univocal and fixed, but are based on a heterogeneous set of more

or less established beliefs about how children *can* and *should* learn. The same can be said, of course, about the way a culture forms its teachers. We hold a number of beliefs, more or less grounded in scientific research and in a local system of values, about the qualities and competences of a good teacher. Teachers themselves form an idea of their own (expected) professional identity (Tateo, 2012). The current mainstream view wants these qualities to be *accountable*. The current system of values tells us that the transition from the state "A" at T_0 and in "B" at T_1 must be visible, measurable and accountable. In the her chapters, Impedovo provides an extensive list of the expected features of teacher professional identity that have been flourishing in literature. She also cunningly reminds us the importance of teacher's *agency*, which it is not all about the qualities and competences that teachers *are required* to possess and develop over their career. Teachers are not passively molded by the academic educational system into accountable professionals of the modern factory, or global company, that we may call post-Bologna-Western educational system.

The three dimensions of teaching-learning process change at a different pace. The construction of cognitive structures is slower than the construction of knowledge in ontogenetic development. Yet, from the research in educational and developmental psychology, we know that they mutually feed into each other. The forms of collective organization of teaching-learning are instead slower to change as they are sensitive to the forms of sociogenesis of the collective life. The paradox of the technological post-modernity is that the increasingly rapid pace of the socio-technological change is questioning the temporality of teaching-learning. We have the impression that the incredible availability of new technologies is changing the ways of schooling too fast. Our cognitive structures do not seem to be so adaptive to new possibilities of constructing knowledge. Again, a new moving horizon is put in front of the teacher. This time, the nomadic nature of the teacher's profession is produced by the nomadic nature of the networking technologies.

Formal education is the social institution that deals with change in stability. The school is the arena where the dialectic between continuity and discontinuity takes place. Every culture is ambivalent with respect to this dialectics. Every culture is at the same time conservative in some respects and progressive in some others. Thus, how can one make sense of the teacher professional identity as both a stable point of reference to the collective value system and a horizon worker? This is the big dilemma that Impedovo's extensive exploration of the teacher's professional development is throwing on the table.

The current Western system of values is heavily relying on the faith in the techno-economic development to solve the problem of educating our offspring to become fully functional members of neo-liberalist democracies. Teachers become mere and replaceable executors of this function, when given the appropriate training. Similarly, we rely upon techno-economic development to provide fully accountable and technically skilled teachers for our schools. As Impedovo points out, the teacher professional development is part of human development. We seem instead to appreciate the opposite: the measure of successful personal development is the functional and accountable professional development based on the job market's requirements. In the dialectics between continuity and discontinuity, the pendulum seems today

swaying towards the side of conservatism. We value continue innovation as form of maintenance of the *status quo*. We want to educate innovators rather than revolutionaries. This may be dangerous, to the extent that it is assumed that the current state of things can only be improved, but not radically changed. We want our teachers to be functional professionals within the limits of the current model. We do not want them to work on the edge of the moving horizon.

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Chapter 9
Final Commentary

Abstract This book is a timely contribution to the field of teacher education that is encountering a fundamental shift across the world. Effective teacher education is now increasingly conceptualized as a collaborative, reflective and recursive process, rather than an individualistic quest to gain technical competence. The book raises many good questions about the ways we should re-conceptualize teacher professional development as it points to key issues that need to be grappled further. Let me comment on the key points that I believe are the major contributions of this book as well as what readers could explore further after reading this book.

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This book is a timely contribution to the field of teacher education that is encountering a fundamental shift across the world. Effective teacher education is now increasingly conceptualized as a collaborative, reflective and recursive process, rather than an individualistic quest to gain technical competence. The book raises many good questions about the ways we should re-conceptualize teacher professional development as it points to key issues that need to be grappled further. Let me comment on the key points that I believe are the major contributions of this book as well as what readers could explore further after reading this book.

First of all, the book provides readers with valuable conceptual tools to bridge theory and practice. It is often the case that the positivistic approach to education makes educational theories a "monster" that makes an educational practice look like a series of static, de-contextualized and non-subjective activities. The monster dismisses the complexity of educational practice and enslaves educators and students by demanding them to follow fixed theories. This theory-into-practice approach was often used to improve teacher education in the last few decades, but it is now known to contain a fatal flaw. Educational theories developed by university researchers in controlled settings are typically context general, while real life practice is inherently context-specific and complex. Around the world, the teacher education community is increasingly becoming aware of the limitation of the theory-into-practice approach

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because of this fundamental incompatibility between theory and practice. Furthermore, a series of comparative studies of students' academic achievement and teacher education systems in the world revealed that subordinating educational practice under academic theories is not really a fruitful path. As a result, many teacher educators are departing from this old-world epistemology and considering new ways to improve education. This book offers useful epistemological tools for the journey.

The book includes a series of contemporary debates on teacher development. Each chapter is structured to include critical discussions on theoretical focus, research suggestions, practice implications as it carefully avoids reproducing theory-practice gap by including actual voices of educations and grounding its discussions in the viewpoints of educators. Through the coherent structure, the book provides readers with a critical lens to reconceptualize teacher professional development with an underlying theme of reflective, collaborative agentive learning.

Here, I would like to point to the popular William James's statement, "Psychology is a science, and teaching is an art." This statement is quite well-known in the field of education, but the sentence that follows is rarely quoted.

> Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality. (James, 1899, p. 15)

Discussions in this book reminds us of "intermediary inventive mind" that James mentioned more than 100 years ago but maintains its significance today. Overcoming the theory and practice gap requires critical examinations of prevalent assumptions on reality with epistemological agility—or an inventive mind in James's term. Readers of this book can see an embodiment of this idea while enjoying the journey that embraces both science and art of education.

Secondly, one of the strengths of this book is that it is grounded in the theme of teacher agency. As a numerous number of studies shows, teachers serve as the key factor that determines the quality of educational practice. Teachers who are teaching the lesson can kindle the love of learning in students' mind or totally destroy it. No matter what pedagogical approach or cutting-edge technology is used, teachers who teach students can heavily influence how students learn in their classes even though many researchers omit the role of teachers in their research models. This human factor issue is something that needs to be researched further.

A teacher is not a blank slate. Each decision-making by teachers—what they do and how they interact with their students—is influenced by their personal and social meaning-making as well as their prior knowledge constructed in their personal history. Furthermore, each teacher has developed professional identity over years based on their own sense of meaningfulness and a history of interactions with their colleagues and larger communities of teachers. Therefore, any decision-making by a teacher in an instructional situation is quite a complex phenomenon. Suppose that you have two teachers in front of you: Even if they may employ the same technology and the same pedagogy, they could deliver significantly different kinds of lessons because of the idiosyncrasy of their meaning-making in the changing situations of their classrooms. In crafting and delivering their lessons, they could pursue different

goals and interpret how students are doing and what they should be doing in their lessons. The question is how we should conceptualize the methodology suitable to study this complexity. How should we interface teacher knowledge and university knowledge to overcome the limitation of each? And in doing so, how can we be critical about our own epistemological assumptions so that we do not fall into the old-world positivism again? These are quite challenging and interesting topics that readers may want to explore further after reading this book.

Thirdly, what is unique about this book is that it conceptualizes technology as a key focal point for conceptualizing teachers' agency and professional identity. Today, we are living in the world that cannot function without technology. Technology serves as not only indispensable tools to achieve our personal and professional goals but also infrastructure that enables fundamental aspects of our professional activities in the society. As this book points out eloquently, teachers' relationship to technology defines the degree of freedom that teachers have in teaching and, most importantly, their professional identities. This is especially true in the world that was hit by COVID-19.

In education, there are many debates about new ways technology can shape the future of education. Many opinions were expressed regarding the roles of AI, data science, VR, adaptive learning system, so on. We need a crystal ball to see how the post-COVID-19 world unfolds, but what is easily predicted is that the central role that teachers play in defining the quality of lessons would not change. Perhaps more teachers may serve as facilitators of learning rather than dictators of classroom, but when teachers facilitate student-centered learning in their lessons, they are the ones who decide how to introduce learning activities and how they interact with their students there. Without involving teachers in the co-planning and envisioning process, I predict that any attempt to transform education would fail.

In fact, this seems to be where many attempts for educational innovation struggle. It is often the case that many recent discussions on educational technology reflects this disconnect between teachers and new technology. On the one hand, it is true that new technology could help students learn more efficiently, but considering that new technology can totally replace the role of of teachers is quite a risky and unwarranted assumption. On the other hand, it would be also wrong to consider that teachers can ignore the potentials of new technology to shape their educational practices and their identity as educators. As professionals, teachers would certainly benefit from improving their practices by exploring new tools and opening up their horizon. This book can be seen as a good attempt to reinstate this delicate balance between teacher identity and new technology.

The book challenges us to consider technology as an artifact that defines teachers' social and professional identity as well as their relationship to the world. This view can bring us new awareness of the relationship between technology and teaching profession, and pushes us to critically examine our assumptions on the nature of teacher knowledge in relation to changing purposes of education in society, as exemplified by the discussion in TPACK in the book.

Finally, the book discusses the importance of community and the social dimension of teacher education that have been increasingly recognized as key elements

that define teacher development. The book talks about the importance of teacher collaborations not only as an approach to catalyze teacher growth, but also the way to develop teachers' "relational agency" in the process. This is a very critical point for Japanese lesson study and similar professional development approaches.

In Japanese lesson study, teachers develop a lesson plan, co-revise the lesson plan, observe the actual lesson taught by one of the teachers while other teachers in the team co-reflect on the study lesson to discuss strengths and the room for improvement and then repeat the process in multiple cycles. To make this process successful, teachers discuss not only the technical dimension of crafting and delivering the lesson such as what questions to ask and what tools to use in relation to the curriculum map, but also the fundamental purpose of the lesson in relation to their identity as teachers. It is typically the case that the aim of the lesson is stipulated in terms of not only academic achievement of students, but also social-emotional development of students as well as forming a humanistic learning community. For instance, teachers who are engaging in lesson study would co-reflect on the quality of a lesson in terms of whether it has risk to benefit only high achieving students, whether it helps underachievers gain confidence in talking about their ideas and whether it can shape students' attitude to listen to each other and learn from their classmates as a learning community. This ethical dimension of Japanese lesson study is rarely discussed but a highly essential aspect of Japanese lesson study.

In the lesson study process, teachers co-reflect on their sense of agency—why they are teaching and what kind of teachers they want to become as they open-up themselves and engage in collaborative and critical discussions on the study lesson with their colleagues. This process is not an easy one, but when the process is completed, teachers often end up creating an enduring bond with their teammates called *kizuna* (絆) in Japanese—an enduring bond between people. In this process, the professional identity is developed to become relational and grounded in the local professional network of teachers working and overcoming challenges together for their students. In Japanese lesson study, teacher collaborations shape their identity as they ground their educational practices in what really matters for them as a community of educators.

The book discusses a series of participative methodologies that could catalyze the similar process of teacher professional development. In the past decades, teacher professional learning has been artificially disconnected from the teachers' sense of agency in the name of academic accountability, but in order to recover from the damages that it has made, what holds the key is to place an emphasis on reflective, collaborative and agentive learning of teachers in teacher education.

Walking this path demands teachers to examine their existential identity—why teachers choose the profession and what it means to pursue the profession in society. In doing so, it would be useful to exchange ideas with those who belong to other cultures and reflect on what it means to teach in different cultural contexts. Learning from other cultures would challenge\us to examine our own assumptions nurtured in our home culture and explore new ways to re-conceptualize education as well as our professional identity. Such an open-minded journey would serve as a mirror that shows us new potentials and limitations that have been over-looked over the years.

The book points readers to such a journey as it defines education as an interdisciplinary and stimulating field where intersections of teacher agency, empowerment, collaborative dialogues and the ethical dimension of teaching play key roles. This inside-out, globally-oriented, technologically-mindful journey would open up a new door towards infinite possibilities of actions to actualize humanistic education and society. This is something what teacher education communities truly need now.

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