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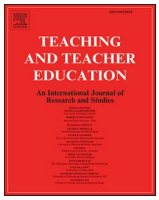

Research paper

Teaching and AI in the postdigital age: Learning from teachers' perspectives

Rachel Moylan [a,*], Jillianne Code [a], Heather O'Brien [b]

[a] Faculty of Education, University of British Columbia, Canada
[b] School of Information, University of British Columbia, Canada

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ABSTRACT

This interview-based study aimed to understand how teachers make sense of their work and themselves in relation to artificial intelligence (AI) and other digital technologies, and was conceived as a means of learning with and from teachers. Navigating recent AI developments raised questions about thinking, creativity, production, and the meaning and value of humanity, along with more practical concerns regarding instruction and assessment. Creating policy and ongoing teacher education opportunities that recognize teachers' capacities for professional judgement while also providing support would encourage thoughtful and creative uses of AI, and avoid pressuring teachers to thoughtlessly rush forward with AI implementation.

1. Introduction

The public release of ChatGPT in late 2022 sparked worldwide interest and a veritable explosion of related speculation as to how new generative artificial intelligence (AI) technologies would affect education. Some expressed worry that ChatGPT would lead to widespread academic integrity violations (Barnett, 2023), ruin students' motivation for thinking and writing (Baron, 2023), steal jobs from humans (Mok & Zinkula, 2023), and destroy the democratic process (Sanders & Schneier, 2023). Others asserted that the benefits of ChatGPT outweighed the risks, and that it could help students think more deeply (Roose, 2023) and lead to innovative methods for teaching and assessment (D'Agostino, 2023; Huang, 2023). Though it is promoted by many in the educational technology industry as a neutral tool (e.g., Cohen, 2023), ChatGPT's perceived capacities for ideation, analysis, and written composition raise many questions in the field of education and beyond.

ChatGPT is part of a wave of recent changes in the capabilities and availability of AI that have drawn attention to the longstanding, complicated relationship between technology and education. Throughout modern history, education has been used to counteract the "autonomous forces" of technological development, and "to prepare and govern citizens in order to regulate or conform them to said development" (Rahm, 2023, p. 16). Rather than problematizing the unbridled growth of digital technologies, education itself is problematized, imagined as required to offer solutions to inevitable technological expansion (Rahm & Rahm-Skågeby, 2023). The dominant educational imaginary today is one of "smoothness, efficiency, and constant connectivity" (Rahm, 2023, p. 17). Attributes like flexibility and adaptability are valued and promoted, as humans must respond to the ever-changing technological landscape.

This positioning of education as a means of supporting technological development seems to correspond to a shift in teacher education, which, has become "subject to the same managerial norms as those that dominate in the business sector. This, in turn, entails amenability to evaluation through the specification and measurement of quantifiable data in the form of impact, output, standards and targets" (Clarke & Phelan, 2017, p. 2), such as those involved in learning and teaching analytics. Sparked by a desire to understand how teachers make sense of their work and themselves in relation to generative AI and other digital technologies, this study was conceived as a means of learning with and from teachers to develop insights concerning paths forward for teaching and research in the postdigital age.

2. Conceptual framework

We approached this study from the postdigital perspective. One of the first uses of the term postdigital was a 1998 *Wired* magazine article in which MIT professor Nicholas Negroponte declared that we had witnessed the end of the "Digital Revolution," (para. 6) and commenced with a more-than-digital era. This was not to say that the digital was over, but that digital technologies had begun to be taken for granted. As Negroponte (1998) stated, "like air and drinking water, being digital will be noticed only by its absence, not its presence" (para. 4). The postdigital perspective is concerned with questions "surrounding the

* Corresponding author. 2125 Main Mall, Vancouver, BC, Canada, V6T 1Z4.
E-mail addresses: rachel.moylan@ubc.ca (R. Moylan), jillianne.code@ubc.ca (J. Code), h.obrien@ubc.ca (H. O'Brien).

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entanglement of technology, culture and social change" (Taffel, 2016, p. 325) and proposes that we are living in a time that is "hard to define; messy; unpredictable; digital and analog; technological and non-technological; biological and informational" (Jandrić et al., 2018, p. 895). As Florian Cramer (2014) explained, the prefix 'post' in post-digital should not be understood to mean 'after;' rather, the postdigital can be understood as a continuation of the digital that is markedly different but somehow similar (p. 13). Just as "postcolonialism does not in any way mean an end of colonialism, …but rather its mutation into new power structures," postdigital describes a perspective concerned with "the state of affairs after the initial upheaval caused by the computerisation and global digital networking of communication, technical infrastructures, markets, and geo-politics" (p. 13). "The prefix post-," therefore, "signals that we have something to talk about" (Sinclair & Hayes, 2019, p. 129).

In many ways, the postdigital perspective can be understood as an attempt to counter the techno-utopian views that often dominate popular and academic discourse. Though the early days of the internet were replete with "utopic visions of free, open, and consensual communities," the postdigital perspective recognizes our "contemporary climate of powerful, tax-avoiding Internet corporations, political meddling on social media, algorithmic tinkering of 'personal' media streams, and the environmental effects of data storage and processing" (Jandrić et al., 2018, p. 895). As postdigital humans, we are entangled in multiple arrangements of human-technology relationships (p. 20). Such relationships, while often involving direct, immediate interaction with digital devices, are also larger than this. Responding to critiques, such as Andrew Feenberg's (2019), of the postdigital as not applicable to the many people in the world who do not have access to digital technologies, Petar Jandrić (2021) explained that "the inability to access computers, networks, and other digital devices does not set one free from digitalization" as the political, economic, social, and environmental effects of digitalization have occurred on a global scale, shaping the physical and social worlds of all people (p. 22).

2.1. Postdigital Education research

Educational researchers approaching their scholarship from the postdigital perspective are often concerned with questions regarding human entanglements with learning management systems, productivity software, and plagiarism detection tools, among other forms of digital automation (Selwyn et al., 2022). As Hamilton and Friesen (2013) pointed out, research regarding technology and education often adopts instrumentalist or essentialist perspectives, which "either imbue technologies with inalienable qualities (essentialism) or posit technology as a neutral means for realizing goals defined by their users (instrumentalism)" (p. 1). The postdigital perspective rejects technological determinism and the associated "magical belief that using technologies will straightforwardly improve learning, purely by virtue of being present in educational activity" as well as instrumentalist views that "technology simply provides a solution," often overlooking "the ways technologies, rather than directly determining outcomes, exert their own influence" (Jandrić & Knox, 2021, pp. 3–4). Discarding the conceptualization of technology as a tool to 'enhance' learning (Bayne, 2015), the postdigital perspective considers the ways in which digital technologies serve as co-constituting forces, influencing our thoughts and behaviours just as we influence them through our data and use.

As Jandrić and Knox (2021) emphasized, essentialist and instrumentalist tendencies "drastically simplif[y] the ways we can understand the relationships between teachers, students and technologies in education, and lead to an impoverished perception of how technology and educational practice are often thoroughly intertwined" (p. 4). Knox (in Arndt et al., 2019) maintained that a central aim of postdigital educational research should be to develop critical understandings of "our present, and direct interactions with technical paraphernalia … as part of broader systems of relations, of which we are a part, but which don't necessarily fall into mutually exclusive *user* or *used* relationships" (p. 5). Continuing, Knox stressed that our relationships with technology reach "far beyond our screens" and that "we can no longer simply choose to be involved with digital technology" as it has permeated us socially and subjectively (p. 5). Fawns (2019) concurred, explaining that "more than something about which we make simple decisions to use or not use, digital technology is something with which we are entangled in complex ways, and which is embedded in the wider culture" (p. 142). As such, there is a need for formations of "more nuanced understandings" (Bayne, 2015, p. 10) of technological entanglement in education, which, we posit, can be developed through collaboration and conversation with teachers as they endeavour to make sense of their work and themselves in the rapidly changing age of AI.

2.2. Sensemaking and professional agency in the postdigital age

Although forms of AI have become a mundane and often unnoticed part of daily life and schooling over the past decades, the public release of ChatGPT marked an epochal disruption: a time when what it meant to be a teacher suddenly did not seem to match what was expected (Weick et al., 2005). Sensemaking occurs at times like these, when "the flow of action has become unintelligible in some way" (Weick et al., 2005, p. 409). Faced with uncertainty, teachers try to make meaning within their changed and changing situation. As they go through the process of sensemaking, teachers continuously examine their unfolding circumstances retrospectively, comparing what has happened in the past to what has just happened to what is happening in the moment (Weick, 2004), and interpreting their retrospective examinations according to individual and collective values and beliefs (Braaten et al., 2022; März & Kelchtermans, 2013). Sensemaking, therefore, can be defined as "an (inter)active and dynamic process by which individuals and groups make meaning from the environments in which they operate, which in turn orients their actions" (März & Kelchtermans, 2013, p. 15). Therefore, in addition to occurring when faced with uncertainty, sensemaking involves ongoing interaction between, among, and within individuals, groups, and their material and discursive contexts (Braaten et al., 2022). In the postdigital age, these material and discursive contexts include digital devices, algorithmic systems, and technological infrastructures, which connect teachers and students in their classrooms to "everyone and everything else, everywhere and all the time" (Brubaker, 2023, p. 1).

According to Kelchtermans (2009), individual teachers have a personal interpretive framework, or a "set of cognitions, of mental representations that operates as a lens through which teachers look at their job, give meaning to it and act in it" (p. 260). This framework develops over time as teachers move through their lives and careers, encountering new people, things, and events, and having new experiences. When faced with a situation that disrupts their understandings of themselves and their profession, a teacher makes sense of circumstances through the lens of their personal interpretive framework; in turn, their framework is adjusted or modified based on their experiences and sensemaking processes during the disruptive situation (Kelchtermans, 2009). Teachers' frameworks develop based on their own individual experiences along with their experiences as part of an organization, such as a school, and as part of a subculture within an organization, such as a subject-area department in a school (Kelchtermans, 2009; März & Kelchtermans, 2013). Sensemaking is also dependent upon "experiences within institutional structures - norms, culture, and regulations - that affirm or interrupt already held beliefs in the service of forming an identity" (Mathews et al., 2017). In addition to the informal and formal policies that create these institutional structures, the AI-infused technological systems that are increasingly entangled in processes of teaching and learning include their own programmed structures, which shape possibilities for thinking and acting (Perrotta et al., 2022; Perrotta & Williamson, 2018).

Notably, research has shown that our human capacities for