

# Reconsidering learning in a socio-material world. A response to Fischer *et al.*'s contribution

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## Abstract

**Purpose** – The purpose of this commentary is to comment on Fischer's *et al.* (2022)

**Design/methodology/approach** – This commentary responds to Fischer's *et al.* (2022) call on envisioning alternate conceptualizations of learning for the digital era. In doing so, the author argues for reconsidering learning in its socio-material condition, situated and made of a web of social and technological relations. In this context, the author takes a relational lens on learning to interrogate taken-for-granted views of (1) personalizing data increasingly used for student learning, (2) emerging educational infrastructures for higher education and (3) the student–teacher relationship mediated by data and algorithms.

**Findings** – In this commentary, the author suggested unpacking assumptions about learning that get reflected in the design and discourses about socio-technical arrangements and transformations in education. Taking the example of personalized learning, the author has illustrated a relational mode of thinking that leads the author to argue that, renewed definitions of learning must be discussed multidimensionally and, most importantly, situated in the material world that learning is already part of.

**Research limitations/implications** – Following Fischer *et al.* (2022, this issue), the author agrees that the focus should be on finding “new ways of organizing learning by exploring opportunities for radically new conceptualizations and practices.” In order to do that it is of utmost importance to problematize the social and material conditions that actively configure learning today and infrastructure tomorrow's learning. Hopefully, these observations will entice others to discuss further the educational transformations at stake in the age of datafication and algorithmic decision-making.

**Originality/value** – The author argues for reconsidering learning in its socio-material condition, which is situated and made of a web of social and technological relations. In this context, the author argues that any attempt to reconceptualize learning from a transformational perspective in the 21st century, as mentioned by Fischer *et al.* (2022), needs to interrogate views and assumptions about the socio-technical relationships researchers, practitioners and educators are contributing to via their practices and discourses.

**Keywords** Data, Higher education, Relationality, Socio-materiality, Personalized learning, Socio-technical infrastructure, Student data, Algorithmic-decision-making

**Paper type** Research paper

## Introduction

How do we envision alternatives to current understandings of learning in the digital age? This is the question that Fischer *et al.* (2022) discuss in the article, “The Challenge for the Digital Age: Making Learning a Part of Life,” which summarizes most of the issues covered at the Symposium: Learning in a Digital World, organized by the GRADE Research school in November 2021 in Umeå, Sweden.



In particular, Fischer *et al.* (2022), attentive to the increasing digitalization of education, problematize myopic views of research on learning and information technology that miss the multidimensional aspects of current societal changes affecting human learning in the 21st century. In doing so, the authors reflect on the disconnect between, on the one hand, established understandings of learning and, on the other hand, the social, cultural, political and economic challenges deeply entrenched in the pervasiveness of digital technologies in society.

In this vein, Fischer *et al.* (2022) underscore “the lack of visionary narratives of what education should be in these transformations” (p. 2). And they claim that “learning in the digital age should not be restricted to creating digital infrastructures for supporting current forms of learning nor taking schools in their current form as God-given, natural entities, but changing current forms of education by developing new frameworks and socio-technical environments for making learning an integral part of life” (Fischer *et al.*, 2022, p. 5). In developing their argument, the authors distinguish “school learning” and “curriculum-driven learning” from “lifelong learning” and “Interest-driven learning” as an attempt to illustrate the encapsulated and top-down vs. the integrative and bottom-up understandings underpinning current conceptualizations of student learning. The distinction matters. It shows Fischer’s *et al.* (2022) argument toward conceptualizing learning as a transversal capacity, a habit, a mindset cultivated throughout life and not only during the school years or with the support of specific digital infrastructures. Such an understanding of learning that draws on lifelong learning (Fischer, 2000) approaches learning from a societal perspective that values learning as a “skillset and acquired tool” (p. 3), not only for individuals but for society. Such a broader conceptualization of learning is developed throughout a set of propositions that call for rethinking (1) educational institutions as social constructs, (2) knowledge as emerging from “renaissance communities” (Fischer, 2013), (3) cognition as distributed between people, and tools (Fischer and Konomi, 2007), (4) learning on demand (Fischer, 1991), (5) interest-driven learning and (6) connected learning as well as (7) analytics measuring what scholars and educators value (Fischer *et al.*, 2022).

While these timely propositions problematize conceptualizations of contemporary learning from a societal perspective (see Tables 1 and 2 in Fischer *et al.*, 2022), they don’t seem to explicitly engage with specific understandings of the socio-material/technical web of relationships in which learning unfolds and develops. Consequently, this commentary looks at such socio-technical relationships to interrogate views of student data, emerging educational socio-technical infrastructure and the student–teacher relationship, which I view as pivotal for reframing learning in the 21st century.

This commentary consists of the following sections. First, I expose the relational point of view applied in the reading of “The Challenge for the Digital Age: Making Learning a Part of Life” by Fischer *et al.* (2022). Such a point of view brings me to situate learning in its socio-material world and to look at learning as made of socio-technical relationships. From this relational understanding of learning, I interrogate views of student data, emerging educational infrastructure and the student–teacher relationship in the highly technologized education landscape. The aim is to unpack assumptions about the socio-material world that learning is part of nowadays. I conclude by underscoring the need to envision alternative narratives of learning based on reflective conversations about the socio-technical (material) conditions researchers, practitioners and educators contribute to via their practices and discourses.

### **A relational point of view on contemporary learning**

Unlike linear, rationalist and individualist ways of thinking about learning, relationality, as a lens, looks at learning through the relationships that constitute it; more, in particular, it engages with learning as made of a net of social and technical relationships. Within these relationships, we understand that learning gains materiality through the use of tools and,

consequently, such materiality has implications for learning, as it potentially transforms “how we teach and learn as well as how we come to interpret learning” (Säljö, 2010, p. 53). Situating learning and teaching into the material world – i.e. its physicality as well as its social organization – causes us to view these activities as embedded within sociocultural activities that are bounded to tools that make them possible (Säljö, 2010; Rabardel, 1995)” (Cerratto Pargman and Jahnke, 2019, pp. 5–6).

A relational point of view on learning focuses on how educational technologies and their material infrastructure participate in the learning and teaching practices in question (Sörensen, 2009). Looking at the socio-material conditions of learning (Cerratto Pargman *et al.*, 2015) means looking at “the specificities of the technology at hand, that is, its materiality, which becomes tangible” [...] “through the constraints and affordances that emerge for the user during use (Kaptelinin and Nardi, 2006; Rabardel, 1995)” (Cerratto Pargman and Jahnke, 2019, p. 6) but also the views and assumptions we (i.e. researchers, practitioners and educators) construct, legitimize and validate in our discourses and designs of digital technologies and platforms (Cerratto Pargman *et al.*, 2022).

Relational perspectives on socio-material practices are not new in discourses about contemporary technologies. Various schools of thought can be grouped under the umbrella of the relational framework (Birhane, 2021). For instance, relational perspectives are reflected in embodied cognition (Varela *et al.*, 2017), Bakhtinian dialogism (Bakhtin, 2013), complex theory (Morin, 2002), feminist perspectives (Noddings, 2013) and others that conceive “existence as fundamentally co-existent in a web of relations” (Birhane, 2021, p. 3). Such relational approaches “emphasize the primacy of relations and dependencies” (Birhane, 2021, p. 4) between the subject (s) and object (s) that constitute each other and co-emerge from the relationship they establish and develop. On this note, Escobar (2018) explains relationality by distinguishing the differences between “from considering things in isolation to considering things in interaction” and “from considering things in interaction to considering things as mutually constituted” (p. 101). Following this relational understanding, we can observe that learning, specifically, and education, in general, have often been understood from conceptual stances of how individuals (e.g. teachers and students) in isolation interact with technologies (Cerratto Pargman, 2021) without explicitly accounting for how individuals interacting with technologies are mutually constituted.

Unlike a lens focused on how individuals interact with technologies, a relational understanding of learning as part of a socio-material world views instead how individuals and tools are mutually configured and shaped through the fabric of the socio-material relationships that unfold between actors (i.e. humans and things) in specific contexts. For instance, Decuyper and Simons (2016) understand “educational practices in terms of the relations between the different actors present in these particular practices” (p. 1). They describe the web of relations that brings together the various educational, social and material actors that constitute the educational context in which such socio-material practices grow and develop. In particular, these authors assert that to understand socio-material practices that involve learning activities, “it is important to look at the relations between different actors – and this to such an extent that actors are, in fact, the result of the relations they uphold with other actors” (p. 2). Scholars in education interested in learning and digital technologies are not exempted from developing relationships with the practices (actors and tools) they study, as we are also actors in the socio-material practices we account for. As such, we, as researchers, practitioners and educators, generate and develop socio-material relationships via discourses, designs and practices that modify how we come to understand learning and how we reason about it (Säljö, 2010).

Compelled by Fischer’s *et al.* (2022) call on the need to generate new conceptualizations of learning and narratives of the future of education, I take a relational lens to interrogate how do we researchers, practitioners and even educators contribute to specific views of data, emerging educational infrastructures and the student–teacher relationship.

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In the following sections, I look at the example of personalized learning to interrogate views and assumptions about the socio-material world in which the future of learning is presently being configured.

### Interrogating views of student data

Nowadays, digitalized learning technologies, which are “promoted as a major aim and reform effort across the contemporary education system” (Zhang *et al.*, 2020, p. 1), depend tremendously on student data and computational power. For instance, personalized learning, which needs student data to customize learning trajectories and individualize learning, impacts students’ learning experiences (Feldstein and Hill, 2016) and generates narratives about data’s value in education.

A critical take on such narratives calls for unpacking assumptions about how student data are configured; for which purposes, by who and how does the use of data in education contribute to a modern and innovative educational system? On this note, Fischer *et al.* (2022) discuss the advantages and disadvantages of the use of such systems for learning and education; but these authors seem to leave out-of-scope issues regarding how data get entangled in socio-technical practices and narratives about learning that are gaining tremendous agency in the current reconceptualization of learning.

Paying attention to student data and, more importantly, research views of it is critical to understand how data not only fuel personalizing learning services for education but also change our understanding of what learning is and could become (e.g. learning quantified; evidence-based education; data-driven teaching). In this context, I argue that taken-for-granted views of student data and tacit assumptions about the value of accessing and analyzing student data for learning matter for generating “new frameworks and socio-technical environments for making learning an integral part of life” (Fischer *et al.*, 2022, p. 6). We find an example of how we can engage with researchers, practitioners and educators’ assumptions about data in Wise *et al.* (2021). In their “subversive learning analytics” piece, Wise *et al.* (2021) draw on critical feminist and intersectional studies in human–computer interaction (Costanza-Chock, 2020; D’Ignazio and Klein, 2020) to identify a series of hidden assumptions regarding issues of power and representation in learning analytics. More, in particular, Wise *et al.* (2021) expose the “objectivity myth” regarding assumptions about data, its neutrality, apolitical character, unproblematic way to be used to predict the future, power to tell the whole story and the quality of speaking by itself (p. 641). These authors also unpack the “perfect process myth” by problematizing data-driven decisions based on the assumption that they always are in the best interest of those impacted, that data can be correctly interpreted, are always used as intended and are the answer to any educational problem (p. 642).

These myths are central to engaging with the socio-material condition of learning and searching for novel conceptualizations. They confront us to investigate how narratives about personalized learning in its socio-technical version are constructed, accepted, and valued. They also awaken other essential questions, such as: For which groups of students does personalized learning work best and worst and why? What is the educational value these systems add to student learning? How do systems such as personalized learning impact the teachers’ understanding of student learning, student needs and knowledge? What teaching practices does personalized learning configure? How does personalized learning impact the student–teacher relationship?

Interrogating assumptions about the socio-technical condition of learning is instrumental in grasping how our views of the material aspects (e.g. tools, data, infrastructure, descriptive, diagnostic, predictive, prescriptive analytics, etc.) contribute to creating expectations that inevitably change our definition of learning. Taking a “subversive” stance in research is thus helpful to “reassess the complex weave of structures that impact” researchers and practitioners’ work “and the way their work ripples into and is assimilated by those structures” (Wise *et al.*, 2021, p. 640).

In this sense, a novel conceptualization of learning, as called by Fischer *et al.* (2022), needs to examine the socio-material relationships researchers, practitioners and educators entertain and construct with student data and data science practices in developments such as personalized learning. As socio-technical arrangements like personalized learning are not neutral, objective or apolitical, it remains of utmost importance to problematize the *raison d'être* of such technological developments in our search for a novel conceptualization of learning.

### Interrogating views of emerging socio-technical infrastructure for student learning

Reconsidering learning to contribute to an alternative conceptualization of learning cannot be indifferent to the complex learning ecosystem that shapes students' learning today. In his keynote for the International Conference of the Learning Sciences in 2018, Simon Buckingham-Shum (2018) drew attention to such complexity by reflecting on the socio-technical nature of the educational infrastructure in the making. By infrastructure, Buckingham-Shum (2018) referred to science and technology studies that understand infrastructure as consisting of both human social practices and digital technologies (Star and Ruhleder, 1994). In this sense, infrastructure is a term that helps us to situate human learning as developing and conditioned by the "multiplicity of relations between an array of stakeholders (e.g. government, the national agency for education, institutional leadership, industry, politics, researchers, designers, teachers, managers, learners) which configure and give shape to educational terrains" (Damsa *et al.*, 2020, p. 370).

Paying attention to emerging infrastructures (i.e. practices associated with learning analytics, personalized learning, predictive modeling, automated grading, etc. and not only protocols and standards) is relevant in the context of this commentary as infrastructures, in general and for learning in particular, "want to be invisible and sink into the background" (Buckingham-Shum, 2018). Emerging infrastructures bound to personalized learning are, for instance, of particular interest as they configure what aspects of learning will be monitored, automated, predicted, customized and so on. However, they are seldom neutral and are changing rapidly nowadays (Buckingham-Shum, 2018). In this sense, envisioning learning in the digital age, as Fischer *et al.* (2022) suggest, entails also questioning the nature of the socio-technical infrastructures that are emerging and the decisions made about student learning by the involved actors (private, public, and national, international, etc.).

Unpacking assumptions about emerging infrastructures in higher education is essential to understanding whose learning is contemplated. Or put it differently: which student groups will benefit and which will be harmed? And why? These questions touch upon issues about integrity and trust in the emerging socio-technical infrastructure for learning which should also have a place in discussions aimed at envisioning alternative ways to define learning in the digital age.

Moreover, we often read and speak of digital technologies that will help innovate in education. For instance, personalization of learning is "a recurring trend across government agencies, popular media, conferences, research papers, and technological innovations. [...] It is in demand as such systems can adapt themselves when providing learning support to different learners to defeat the weakness of one-size-fits-all approaches in technology-enabled learning systems" [...] Human one-on-one tutors can do this. Now digital systems can do so as well" (Shemshack and Spector, 2020, p. 3). While providing just-in-time, personalized feedback to students is attractive and innovative, it is also driven by a need to be more efficient when teaching more students. In this context, is it fair to ask if the infrastructure for learning we contribute to as researchers, practitioners or educators is efficient, cost-benefit-driven but also value-driven? And if so, which are the values that we would like to be underpinning the innovative infrastructures supporting personalized learning?

Another valid question to ask pertains to a discussion about bias, ethics and privacy issues that have drawn much attention, especially with the massive presence of multinational Edtech in public local schools and universities. While questions about complying with ethical principles in developing emerging socio-technical infrastructure are essential, questions about social justice and oppression of vulnerable groups in society (cf. D'Ignazio and Klein, 2020) also need to be articulated in education and debated *vis-à-vis* reframing learning today.

In this context, contributing alternate visions for learning needs not only engage with learning modes, curriculum, learning theories, topics structure, teachers' role, strengths and challenges, (see Fischer *et al.*, 2022) but also with the nature of the social and technical infrastructures for learning and education researchers, practitioners, and educators are developing, legitimizing and making invisible.

### Interrogating views of the student–teacher relationship in the increasing digitization of education

Putting the focus on the student–teacher relationship in the contemporary learning landscape has to do with the need to interrogate prevalent discourses on student performance, output and efficiency in education (Larrabee Sønderlund *et al.*, 2019) that overlook the impact of developments such as personalized learning on the student–teacher relationship. Issues about how the extraction of student data and the specific algorithms applied to it impact students' views on teachers and vice versa seem to be secondary or outdated. Interestingly, the student–teacher relationship, particularly in higher education, is an under-researched area that needs comprehensive and systematic examination (Hagenauer *et al.*, 2021). The overall impression is that the student–teacher relationship is in the context of personalized learning, either romanticized (cf. relationships between students and teachers will continue to hold no matter what; will become more effective) or neglected (cf. digital technologies, data algorithms will not impact the student–teacher relationship at all or at least not negatively).

Such *romantic* (optimist) and *indifferent* views have in common the assumption that the relationship student–teachers is fundamentally organized around epistemic transactions (cf. Freire's banking model), characterized by a relationship wherein the teacher deposits knowledge in the students' heads viewed as containers. In this context, *what* is taught/learned is prioritized and most valued, and *how* we teach/learn is put aside. Discussions about how we teach and learn are abbreviated. Relationships other than epistemic don't count as pedagogical, although Tormey speaks, for instance, of emotional support in teachers' feedback on students' works (2021). The instrumental understanding of the student–teacher relationship as epistemic transaction, needs to be revised, scrutinized and debated as it actualizes cognitivist and behavioral theories about learning dating from the 1950s and 1990s.

More specifically, as ideas about constructing knowledge get disassociated from learning as always happening in the context of a social relationship, it is no wonder that socio-technical practices bound to personalized learning systems are welcome in education. Such practices gain agency from epistemic assumptions grounded in representational (e.g. cognitivist and behavioral) rather than relational understandings of student learning. Issues about how the student–teacher relationship is shaped with platforms such as personalized learning are important to unpack in current debates about the future of learning and education.

Furthermore, current views of learning in the complex socio-material world we live in reflect a problem-free student–teacher relationship where the entrance of data and algorithms dominating personalized learning is changing such a relationship in positive ways only. From this, perspective of learning, teachers seem to be viewed as information providers; while students as "objects" of curricular knowledge or beings without "agency" (Magill and Salinas, 2019, p. 6).

Reconsidering learning in the digital age needs to revise current assumptions about how we view the learners, from which experiences and stances, as well as how we understand



change in the student–teacher relationship in the present educational landscape. For all those teaching at university, we know that the relationship with students is much more than transactional, or purely epistemic; it is also social, dialectical, negotiated, regulated by norms and laws and situated within power relationships (Magill and Salinas, 2019). In this sense, we need to pay attention to the student–teacher relationship in the context of socio-technical arrangements such as personalized learning and ask: how does the student–teacher relationship change? What is it gained with personalized learning in education? What is it lost? On this note, Audrey Watters (2021) makes a critical contribution by engaging with educational technology’s historical and political aspects to get a deeper understanding of why developments such as personalized learning and individualized instruction are still prevalent today. Showing that the history of personalized learning “has been a century-long project by educational psychologists and by business,” Watters (2021) warns about the learning frameworks connected with neoliberal ideologies prioritizing corporate profit instead of human development. In this context, reconsidering learning in the digital era needs to question the taken-for-granted neutrality of platform design and algorithms (Morris and Stommel, 2014). Designing for the students, the teachers and their relationship is a socio-technical practice “informed by beliefs of what counts as knowledge and learning and coloured by assumptions about gender, race, class, capital, literacy and in service of and perpetuating existing and new power relationships” (Prinsloo and Slade, 2017, p. 112). This feature implies that the current optimism with novel technologies enhancing student output and effective education needs to reflect on how the student–teacher relationships not only a site of epistemic transactions but also a terrain for citizen development and cultivation (Magill and Salinas, 2019). Following this, discussions about envisioning learning otherwise need to extend to debates about the types of student–teacher relationship we want to cultivate in the future: will the student–teacher relationship be fortified, empowered or degraded and suppressed with emerging technologies? How will the student–teacher relationship turn out? Will it become authoritarian, intrusive or relatively democratic, tolerant and compassionate?

## Conclusion

In this commentary, we have argued for the need to interrogate views of data, emerging educational socio-technical infrastructure and the student–teacher relationship to motivate alternative conceptualizations of learning in the 21st century. In particular, we suggested unpacking assumptions about learning that get reflected in the design and discourses about socio-technical arrangements and transformations in education. Taking the example of personalized learning, we have applied a relational point of view to discuss the inherent sociality and materiality characterizing today’s learning in a complex socio-technical landscape. As an array of, digital tools, apps and platforms are involved in student education, renewed definitions of student learning must be discussed multidimensionally (Fischer *et al.*, 2022, this issue) and, most importantly, situated in the socio-material world that learning is already part of.

Hopefully, these observations will entice others to debate further the educational transformations at stake in the age of datafication and algorithmic decision-making. Following Fischer *et al.* (2022, this issue), we agree that the focus should be on finding “new ways of organizing learning by exploring opportunities for radically new conceptualizations and practices.” In order to do that we will also need to problematize the social and material conditions that actively configure learning today and tomorrow.

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