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Special Issue: Data ecosystems in education: opportunities and challenges

Editorial of the Special Issue

Data ecosystems in education: opportunities and challenges

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The integration of ecosystems that promote the massive use of data and the large-scale processing of this data into educational processes is termed “the datafication of education”. This complex, international and multifaceted phenomenon brings with it a range of effects at the level of systems, policies, pedagogical strategies, and research (Macgilchrist, 2021). Furthermore, its impact extends to the daily practices and human experiences, encompassing both online and in-person educational environments.

As digital technologies continue to proliferate and integrate into education, numerous assertions arise regarding the potential opportunities they could provide. This becomes particularly pronounced in the post-pandemic era, where the surge in remote online participation is depicted in certain contexts as the 'new normal.' Additionally, the palpable enthusiasm surrounding generative technologies, specifically those leveraging vast datasets (referred to as generative artificial intelligences, hereafter AI), has intensified in recent years (Selwyn & Gašević, 2020; Williamson, 2017).

The massive collection and storage of data has intensified through ubiquitous technologies, which co-exist with human actors. In addition, we have witnessed an increase in the intentional processing power of this data at a speed unimaginable a few years ago (through the application of AI). This has turned many aspects of our lives into data, from which value is extracted by third parties through processes of datafication (Birch & Cochrane, 2022; Komljenovic, 2021).

Concurrently, the broader public, encompassing the educational sector, has been promised the culmination of the digital transformation of educational processes following the profound pandemic crisis (CoVid-19) (Williamson & Hogan, 2020). This transformation encompasses “personalization”, arguably importing the ethos and values of the market and a consumer mentality to education, in a manner similar two other forms of consumption online (Hayes & Cheng, 2020; Holloway, 2020).

The recent development of generative AI and applications such as ChatGPT illustrate in a striking and controversial manner the destabilising nature of these technologies, raising urgent questions regarding human and non-human agency and authorship (Gourlay, 2022). In the case of ChatGPT and similar software, the ability of AIs which have been trained on large language models to produce apparently convincing texts, has created something of a crisis in educational circles. This has resulted in institutions rushing to respond in terms of policy and practice,

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particularly surrounding assessment due to the potential for students to use these technologies to author text, instead of producing writing through reading study and human authorship (Holmes et al., 2022).

In a related development, an expanding economic sector- the EdTech industry - has been quick to capitalise, showcasing its ability to monetize the global educational landscape (Komljenovic, 2021; Lewis et al., 2022; Williamson et al., 2022). This industry not only extracts profits from its current and future engagements with private or institutional clients but also generates income based on capturing the motivation of their users and achieving significant levels of social and political influence. All the above is magnified by the proliferation of the use of online platforms and tools in educational spaces (with integral "solutions" including Learning Analytics and Online Exam Proctoring), offered for free by many EdTech companies at every educational level and, in many cases, with little or no specific regulation.

The datafication and digitization of education introduce a host of practical, ethical, and political challenges, touching upon crucial areas like ethics, privacy, discrimination, and surveillance (Pangrazio, 2022; Selwyn & Gašević, 2020; Williamson, 2017). This dynamic landscape also poses complexities in our approach to technology, education, and teaching, shaping the roles of members within the educational community and redefining the nature of pedagogical relationships (Atenas et al., 2020; Castañeda et al., 2024). The fundamental dynamics of human-technical relations undergo profound changes with the omnipresence of digital technology (Gourlay, 2021).

Public opinion, permeating every facet of contemporary society, remains consistently polarized. Some factions assert that progress and education are inconceivable without technology, contending that AI has the potential to enhance education even in the absence of human oversight. Conversely, others vilify technology, passionately advocating for its prohibition in certain contexts.

The field of educational research, by its part, has responded to these currents in various ways, is some quarters enthusiastically 'embracing' these developments as an apparently straightforward sign of progress (Flensburg & Lomborg, 2023). However, there is also a growing body of work which adopts a more questioning and critical stance towards datafication and digitization in education, alongside a growing body of empirical research which seeks to understand in more detail the impacts and effects and a range of educational settings.

This special issue aims to bring together articles that problematise the challenges and unintended effects that new mechanisms and dynamics fuelled by these data-driven technologies have introduced into education. This call aims to encourage researchers and practitioners to share studies, research, debates, and academically well-founded reflections that propose critical visions. This aims to provide those who are interested in education deeper analyses, to allow us to understand the current educational and technological landscape, and to foster a revaluation of relevant educational issues that should be part of our work in the coming years. With this in mind, the following papers have been collected.

In their paper, Salomao-Filho; Wasson, Lameras & Malosek explore data literacy for citizenry, discussing how this vital capacity can be developed and promoted at an institutional level. They report on a review which consisted of mapping alongside a more traditional narrative approach.

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This extensive study covers a six-year period from 2015 to 2021, analysing a substantial corpus of studies. They conclude that the research reviewed on digitisation is somewhat varied in terms of disciplinarity; they also describe it being 'scattered'. This useful bringing together of these findings provides the field with a valuable reference point and a series of policy recommendations.

In a related paper also focusing on the development of data literacy, Raffaghelli, Ferrarelli & Khün, in contrast present a study which used collaborative ethnography, focusing on educators and how they understand and relate to datafication of everyday teaching practices. The authors highlight the complexity of the data structures which permeate educational practice, focusing on how professional practices are discursively constructed and how educators position themselves with respect to datafication and the development of critical data literacy, stances which they term 'postdigital positionings'. The participants in the ethnography are described as women with complex migrant identities and roots in the Global South, and this study takes an intersectional perspective on their positionalities in the postdigital context.

A paper by Nøhr, Stenalt &Hagood, explores a related theme, in an investigation of university teacher agency with relation to technology. In this Danish study, the researchers administered a survey to 344 teachers, focusing on teachers' sense of their own agency and power to influence aspects of technology use in their teaching. The data was analysed using exploratory factor analysis, and the authors identified three themes: the desire to control digital data, the power to do so being distinct from teachers' power, and how technologies are applied in teaching. They conclude that these findings constitute a case for revisiting the role of teachers in university decision-making.

The special issue also features a further systematic review, in this case focusing on questions of ethics, and the various moral dilemmas which are generated by the production of scientific literature. The De La Iglesia-Ganboa & Arroyo-Sagasta reviewed 15 articles which focused on digitalization processes in education. Focusing on the question of whether ethical frameworks were present in these processes, they found the there is a lack of consensus surrounding ethics and a dearth of established ethical frameworks guiding digitalization processes in education. They argue that there is a need for a framework to generate a legislative framework whose purview would extend beyond questions of privacy alone.

Finally, Gonzalez-Mingot & Marín present a study of datafication in the context of Catalan primary education, also looking at teachers' perceptions. They argue the datafication of primary education has been accelerated by the processes of neoliberalisation, and what they term 'technological solutionism' imposed during the COVID-19 pandemic, resulting from the encroachment of commercial EdTech providers. They set out to identify the main actors involved in these networks and explore how primary school teachers perceived these in terms of responsibility for the technologies. They applied a sequential mixed design based on 491 questionnaires and 19 interviews with teachers. They found that the department which represents the public administration, and the tech giant Google were the main actors in primary digital education in the region, however, they found in their analysis of the interviews that most of the teachers in the study were not aware of how these agents manage the data. They recommend based on their analysis that there is a need for the generation of educational practices and protocols to guarantee the digital sovereignty of the data of teachers and students.

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Several interconnecting themes can be observed in this group of papers. Despite using contrasting methodologies and taking place in a range of contexts, the papers resonate in terms of their critical stance towards the operations of datafication, and how commercial interests are acting in the educational sphere. There are also concerns across the studies regarding ethics, transparency, and privacy for teachers and students, alongside often mismatched perceptions of social actors on the ground, and a perceived lack of agency on the part of teachers.

These studies provide rich and varied evidence from fields of practice of the effects on education in terms of practices, but also identities and ontologies. This critical research agenda is of vital importance to our field in the context of ever-accelerating technological developments, unreflective utopian discourses of 'transformation', and increased neoliberal encroachment into education.

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