PROTOTYPING AN EDTECH ASSESSMENT TOOLKIT: TOWARDS TECHNICAL DEMOCRACY

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Online exam proctoring, facial emotion recognition, conversational AI, automated essay scoring, aggression detection, bus routing optimization, and school choice algorithms. While we refer to these technologies usually as edtech, they are about much more than technology and education. Edtech is a fast-growing multibillion-dollar industry composed of tech companies, business managers, market forecasters, investors, and private equity firms (see Williamson, 2022). The financial interests shared by these stakeholders accelerate the integration of new edtech products into schools and universities. HolonIQ – an organization specializing in monitoring investments within the education sector – forecasts that worldwide expenditures on educational technology will surge to $404 billion by the year 2025 (HolonIQ, 2022). As AI and proprietary edtech products are rapidly being integrated across schools and universities, the inner workings of potential benefits and harms are complex, hidden from view, and under-explored amongst education stakeholders (author). A key problem is that edtech is often over-hyped and deployed with little scrutiny across a variety of essential educational services: school operations, teaching and learning, plus staffing.

Learning through shared uncertainty

To help education practitioners and administrators critically explore these systems, deliberate about their consequences, and weigh up possible immediate and long-term inequalities, this paper presents the prototype of an edtech assessment toolkit (https://education-futures-studio.org/toolkit/) . The toolkit intends to facilitate collective forms of governance, slow down the implementation of new technology and enable

educators to explore impacts beyond the industry's marketing claims. The prototype brings awareness to the potential of participatory design to explore accountability, transparency, and governance of AI-based systems through collective forms of experimentation. It is thereby embedded in a body of work aiming to make technical democracy (Callon et al., 2011; Thompson et al., 2023) a key feature in the design, implementation, and use of socio-technical systems like AI in the public sector.

The overarching aim of this paper is to illustrate how technical democracy and learning can be advanced as a defining feature of media futures in the public sector. In our example, we explore this through the development of a prototype designed for education. The premise of the toolkit is simple: if a school is approached, for example, by an edtech company, stakeholders can use our toolkit to learn, deliberate, and discuss new technologies and collectively decide on a course of action. When we refer to technical democracy, we mean attempts to include, activate, and mobilise ordinary citizens into the development and implementation of emerging information technologies (such as teachers into the implementation of AI products in school) through collective forms of experimentation (Callon et al., 2011). Prototyping on the other hand refers to the process for generating and testing ideas with material objects, which can inform new possibilities and solutions. While commonly associated with design and engineering fields, 'prototyping' is now being deployed more broadly as part of policymaking and transdisciplinary research projects focused on grappling with complex technologies and issues (Gengnagel et al., 2015; Gils et al., 2022).

The toolkit prototype integrates insights from previous and ongoing presentations, collaborations, dialogues, and workshops with cross-sectoral stakeholders, including interdisciplinary researchers, educators, policymakers, students, teachers, department representatives, campaigners, and advocates. Therefore, learning through experimentation here is twofold: The toolkit is both outcome and stimulant of collective forms of experimentation. We have learned about socio-technical issues through prototyping, and the prototype can draw people together in collaborative processes where they can identify issues and decide collectively on appropriate measures (Lanng et al., 2022).

The EdTech Toolkit

To illustrate the benefit of our methodology leading to the development of the toolkit, the paper presents three tools: the possibilities matrix, the issues register and the counter-archive.

The possibilities matrix is a tool to brainstorm non-technical alternatives and edtech workarounds to identify varied possibilities. Finding alternatives to edtech is about critically and creatively exploring potential and possible futures in education that do not rely on over-centralisation and excessive commercialisation (Selwyn et al., 2020). This requires new ways of reimagining education and the role of emerging technologies. For instance, exploring not just everyday alternatives, but also speculative and utopian approaches which contest the assumptions and hype of edtech (Macgilchrist, 2021).

The issues register is a tool to explore how a range of technologies, stakeholders, and power relations shape socio-technical systems over time. Artificial intelligence registers are websites that describe the features of AI systems used in geographical areas or organisations (Cath & Jansen, 2021). Registers can potentially support democratic participation in government use of AI by providing mechanisms for transparency, feedback, and building 'trustworthy AI' (Haataja et al., 2020). However, existing AI registers are seen as problematic. Issues include registers with limited information, which can be seen as a form of ethics 'washing' that is untrustworthy and introduced with little input from those who either use or are affected by AI (Cath & Jansen, 2021). Our register aims to communicate a range of issues, algorithmic models, and examples that can inform collective learning and experimentation specific to the education domain. In this register, users can learn how socio-technical issues arise from the integration of specific computing models across a range of educational contexts.

The counter-archive is a tool to explore socio-technical issues and examples from around the globe. The purpose of this tool is to understand how different cultural records from the past can render visible issues and possibilities for shaping edtech in the present. The process of 'education counter-archiving' refers to retracing the cultural records of data infrastructures and inequalities in education" (author) and surfacing historical processes, conditions, and conflicts associated with emerging technologies (Williamson & Eynon, 2020). This process aims to surface the hidden values, uncertain archives, and ethico-politics which imbue algorithms and automated decision-making (Agostinho et al., 2019; Amoore, 2020; Kitchin, 2017).

Slowing down and Opening up Public Service Industries

As the edtech industry accelerates the implementation of its products and conceals their development, the edtech assessment toolkit can be understood as a provocation to slow down and open-up. Our prototyping process and toolkit offer an exploratory, yet pragmatic, tool for enacting technical democracy. We believe this approach has merit for other public sectors that grapple with the introduction of emerging information technologies like health, social services, and urban planning. Our approach aims to inspire collective learning and experimentation towards *political and democratic designs (DiSalvo, 2010; Mouffe, 2013)* with the potential to interrupt public sector design and create spaces which move from consensus to dissensus in an age of automated decision-making (Swist et al., 2024).

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