The 2023 Global Education Monitoring (GEM) Report Concept Note on Technology and Education

The 2023 Global Education Monitoring (GEM) Report Concept Note on Technology and Education:

A Joint Response from the University of Edinburgh's Centre for Research in Digital Education and Comparative Education and International Development (CEID) Research Group

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Building an Authoritative, Balanced Report

Technology can play a positive, neutral, and detrimental role in education. This more balanced recognition of the possibilities of technology seems largely absent in the GEM Report Concept Note. If the structure of the full report follows that of the Concept Note, readers may quickly conclude that technology is the solution to all things. Even attempts to recognize the context dependent nature of outcomes can be interpreted that the benefits of technology are certain, if we just get the conditions right. This largely overlooks embedded challenges in education that cannot be resolved through the application of technology. **In our response to the GEM Report Concept Note we hope to elevate issues and concerns that will better balance the discussion on education and technology.** To this end our response starts by considering alternative questions that highlight stubborn educational challenges in which technology may not be the solution before addressing two of the five questions explicitly laid out in the concept note. Recognizing the importance of bottom-up, community-led education, our response ends with an example of country push back against the largely global, commercial forces driving the current state of technology and education.

Two macro questions seem to guide the concept note, and therefore the potential structure of the report: (1) What Education Problems Can Technology Address? And (2) What Conditions Need to Be Met for Technology to Support Education? To provide a more holistic, balanced report and not come across as simply a 'technophile' we'd suggest additional questions that may be raised to recognize the limitations or shortcomings of education. These could include:

- What education problems are unable to be addressed by technology?
- What education problems are exasperated by technology?

Technology cannot be seen as a solitary and instrumental actor in education but as an interdependent variable that brings with it questions around **access and equity**. As more education is enacted in technology, we should be clear as to what technology can and cannot do for education, beginning with the issue of access and use of technology and connectivity overall. Technology brings with it an additional set of barriers to entry that need to be considered in any educational response. This includes access to devices, access to connectivity, access and capacity for use of these devices and this connectivity, and access to the social capital necessary to engage with this access within the sociocultural context that this education is being performed, as it is the quality of one's ability to act with and through the digital that marks the divide between the marginalised and the privileged, which focuses attention away from simply the distribution of technologies and connectivity.

Each of these variables potentially represents a barrier to education; as they intersect, those barriers exponentially increase. In India (Sarin et al., 2017), merely 3% of households have **access** to the internet on computers. The proportion of mobile internet users is as low as 28%, which also includes persons with multiple connections. Home access to computers and the internet is low in sub-Saharan Africa (Frankfurter et al., 2020). In both locations, overall numbers betray significant urban/rural digital divides. These divides were exacerbated during the pandemic, despite efforts at establishing equitable access through zero-rated approaches to educational content (McBurnie et al., 2020).

Technology can fail to account, and even amplify, existing **social stratification**. For women and girls, the **gender digital divide** (Jorge, 2020) and the exclusion experienced is rather severe. Recent studies from Afghanistan, Palestine, and Libya show that girls in conservative cultures are often prohibited from using internet even for learning. Globally (UNICEF, 2020),

the shift to online learning can push 31% of schoolchildren out of education. For rural and poverty-ridden households, it can mean a 75% drop in access. Despite the spread of the internet over the last decade, a reliance on educational technology implies more exclusion than inclusion for most developing contexts. Technology alone doesn't overcome social stratification, norms, and contexts and, in fact, can amplify them. This makes the use of technology in education problematic particularly for historically marginalised groups such as girls and women, displaced populations, and rural populations.

Further, technology **engenders commercial imaginaries** that can augment rather than mitigate educational and colonial divides. This includes an emphasis on scale, lower-cost points, and overall efficiency in the educational process. This has cascading impact on the types of pedagogy being promoted therein, particularly towards a broadcast, commercial publisher model (Weller, 2018) where education becomes a matter of disseminating content rather than a localised, highly situated interaction between students and the teacher. Such broadcast models are perhaps best typified by MOOCs and the contested efforts of for-profit systems like Bridge International Academies in sub-Saharan Africa and South Asia (Riep, 2017) and their role in potentially eroding local educational autonomy, particularly around teacher professionalism. In this context, technology is framed as a transparent instrument for educational export, keeping (largely Western and Northern) curricula, pedagogy, and educational values intact whilst they are broadcast to a global population assumed to be in deficit (Gallagher & Knox, 2019).

As a tool for **education governance**, technology limits policy landscapes and weakens existing institutional structures. In India, online portals and lottery systems are used for enrolling disadvantaged children to school (Wad et al., 2017). The sophisticated tools of digital information system lure administrators with their single-point controls. However, for the target population, they pose multiple access barriers and a steep learning curve. The seemingly intelligent algorithms often exclude technologically challenged learners under the garb of system efficiency. A technology dependent interface limits any scope for grievance redressal or recourse. A **policy** emphasis that increasingly makes a reliance on educational technology explicit (Gallagher, 2019), especially as a cost-effective measure for reaching disadvantaged learners and as meeting the demands of international quality regimes like PISA, further weakens local autonomy and institutional structures in the face of drives towards technology acquisition and use in education.

Particularly in underserved locales, there is a need to move away from the binaries of offline and online education; of face to face and remote instruction. **Blended models, responsive to the local contexts in which they are situated, are critical.** Blended models assume an interplay between the online and the face to face that allow for the curation and design of material and instruction for specific environments in contextually relevant ways. They allow for the leveraging of existing infrastructure (connectivity, predominantly mobile devices present in the community, school, or home), resources (open educational resources alongside localized content) and localised expertise (particularly teaching expertise) towards an augmentation of education as currently practiced. Such models, ones that explicitly surface the critical role of the teacher in this process, have generated significant outcomes (Beg et al., 2019). This blended learning would explicitly leverage existing technology (mobile devices, most commonly), would be platform agnostic, would be designed in tandem with teachers, and would leverage existing connectivity, an approach best typified by learning management platforms like Kolibri that are responsive to intermittent connectivity (Kabugo, 2020).

Whether blended, online, or face to face, **well-trained, professional, and motivated teachers are irreplaceable**. Technology alone cannot and should not replace robust teacher training programmes in tertiary education but rather augment them. This can include technology to support the mentoring of new teachers in underserved locales (Mendenhall et al., 2019), the development of communities of practice through accessible technology (Meunier, Meurice, & Van de Vyver, 2019) to share learning, and direct instruction on pedagogy that resists transmissive forms of education that are often the hallmarks of tech-driven models of education.

Addressing Requested Questions

To ensure that a critical perspective on education and technology receives the attention it deserves in this section we focus on two of the five proposed questions that we believe are disproportionately represented in the main arguments put forth in the concept note. Prior to this we would like to acknowledge the focus the report aims to place on equity and inclusion. Our contributions in this section largely align with these goals, adopting a social justice perspective.

Concept Note Question 2: What do we know about the potential negative impacts of technology on education challenges in each of these areas?

Although digital technologies can be employed to support positive outcomes in education, they also introduce new risks and dangers.

Dependence on private data-processing platforms. As digital education technologies extend into diverse functions and operations of schools and universities, public education systems and individual institutions become dependent upon private and commercial technology suppliers of data-driven platforms. During the COVID-19 pandemic, multinational businesses including Google, Microsoft, and Amazon extended their reach in the education sector dramatically, acting as emergency providers of online platforms for remote education with long-term business aims to operate as private infrastructure for digital public education (Williamson & Hogan, 2020). The Google Classroom platform, for example, now reaches in excess of 150 million students worldwide, and is being used consistently as a learning management system by schools on return to face-to-face teaching and learning (Perrotta et al., 2021). These kinds of platforms introduce schools to particular ways of managing, organizing and facilitating teaching and learning, based on a distinctive view that education can be improved by becoming 'data driven' (Decuypere et al., 2021). They are built on a model privileging the mass collection and processing of student data for purposes of improving educational 'efficiencies' and raising achievement levels (Jarke & Breiter, 2019), as well as commercial purposes of service improvement and product development (Beneito-Montagut, 2017). The key risk of public education dependency on private platforms is that digital data remains poorly regulated, with weak data governance controls on businesses that collect and process student data as a core part of their operations, and teachers and students usually left with very little choice to opt-out of either the use of such tools or the data processing they perform (Day, 2021). The legalities of student data processing for service improvement and product development under the 'lawful processing' and 'data subject rights' terms of GDPR remain highly contested (Ducato et al., 2020).

Integrating education technologies into interoperable 'cloud' networks. The prevalence of student data collection and processing as a core operating model of technology in

education is driving the rapid integration of different services and platforms into interoperable networks. Google Classroom and Google Workspace for Education both utilize application programming interfaces (APIs) to facilitate the connection of third-party applications and platforms, twinned with single sign on functionality to permit users to sign in to all their edtech applications from a Google account, which enables student data to flow between applications and companies and generate value for those companies that can access the data (Gulson et al., 2021). For Google, the creation of a new 'Marketplace' model of third-party add-ons both functions as a kind of 'app store' to extend the functionality and reach of Classroom and Workspace, and expands its capacity to gather student data at scale from across the vast edtech 'ecosystem'. Learning management system and online learning providers operating in the schools and higher education sectors, such as Blackboard and 2U, have also begun merging into new 'mega-edtech' conglomerates of multiple interoperable services. These new interoperable networks are built on the capacities of cloud computing for server hosting, computing power, data storage and analytics, provided by corporate cloud operators such as Google Cloud, Microsoft Azure, and Amazon Web Services. The result is that schools and universities are enmeshed in the business models of global 'big tech', and must then subscribe to the terms and conditions, payment structures, and shifting business models of these multinational private technology corporations (Komljenovic, 2021). The risk is that institutions lose autonomy over access to data, are open to potential data leaks, and must adapt to the demands of cloud proprietors (Fiebig et al., 2021).

Algorithmic bias and automated pre-emption. Many educational technologies function through computer algorithms with increasing capacity for automation, prediction, and pre-emptive intervention (Gulson & Witzenberger, 2020). Commercially available technologies including edtech learning platforms, learning management systems, and commercial technology applications aimed at schools and universities feature capacities for descriptive, predictive, and even prescriptive learning analytics (Perrotta, 2021). These features of algorithmic and automated technologies in education are often termed artificial intelligence for education (Williamson & Eynon, 2020). A key risk of such systems is that they can reinforce and reproduce existing social, economic, racial and gender biases, by comparing new data to historical data as the basis for individual-level interventions (Whitman, 2020). A further risk is that such learning analytics technologies may act pre-emptively to shape students' future learning trajectories based on partial calculations of their progress and performance on narrow measurable criteria (Perrotta & Selwyn, 2019). An outcome of such predictive profiling is the emergence of 'digital redlining' in schools and universities, where certain students are excluded from access to knowledge on the basis of predicted calculations of their academic performance based on reductionist measures of learning (Witzenberger & Gulson, 2021).

Concept Note Question 5: How can the negative consequences of the use of technology be addressed in education and in the way they impact education?

Recognizing local realities and ensuring the voice of educators are important to ameliorate the potential negative consequences of technology on education.

The need for better stories. The futures predicted for education by technocorporations are rarely built on the idea of our educational institutions as sites of civic and social purpose. Such imagined futures are routinely characterised by pervasive analytics, datafication, scaling of student numbers, routinised surveillant practices, the hollowing-out of campuses and the delegation of teacher responsibilities to algorithms. This is a future imagined according to the

values of growth, scale, 'efficiency' and progress toward a universal, global 'knowledge economy' (Facer & Sandford, 2010), and is often framed as more or less inevitable. Such 'future imperatives' for teaching push us away from understanding educational decision-making as based in shared and articulated values, toward seeing it as being driven by the need to respond rapidly to technological change. Within such a context, it is urgent that new visions for the shape of the future are produced and shared by educators and educational institutions themselves. These need to be able to articulate confident, alternative imaginaries able to counter those which currently dominate educational future-making. Participatory practices and programmes of work – such as the Near Future Teaching project at the University of Edinburgh – can work against the data-driven, extractive and problematic future imaginaries of 'big tech' and help articulate more resilient and preferable futures based on collectively-established values.

The value of community-based participatory design. Studies of participatory practices have illustrated that technologies are remade and adapted to local practices and have highlighted that technologies will always be used in different ways in different contexts (King et al., 2019; Tenhunen 2018). Engagement with community-driven research from other parts of the world can provide insights into practices that can situate the development of educational technologies in local contexts by and for those tasked with using them: teachers and students.

A context-driven and highly participatory approach to enable communities to define the parameters of use and meaning of ICT themselves in education is ideal (Bentley et al., 2019; Okon 2015). **Community-led participatory research, development and future-making strategies can empower educational institutions to imagine, describe and build their own preferable futures for education with technology.**

Global Pressure and Local Push Back

The global pressure to adopt technology has created tension in education management locally, leading to attempts to control 'edtech' in some areas.

The post-COVID educational realities have revealed a world of even greater inequalities than those that we were aware of before the pandemic hit. In addition to that, the COVID-19 pandemic resulted in unprecedented and multidimensional challenges for education systems globally, challenges that most governments appeared as ill-prepared to face. Digital education responses, and the rise of education technologies more generally, were quickly seen both at the international and national contexts, as the best way to prepare education systems for the future, as the digital pivot was largely seen as the go-to solution for crisis management. Both national governments and all major International Organisations supported this framing and made a case for the role of significant investment and training for teachers and students in the use of such tools. Yet, there are significant disparities in countries' access to such 'edtech' solutions, as well as lack of preparedness to utilize education technologies meaningfully. More importantly even, there are crucial questions raised in relation to the ethics and challenges of allowing a public good, such as education, being handled, capitalised upon, bought and sold for the benefit of private sector companies.

For example, as educational technology continues to mutate and expand in its uses to address equity and inclusion issues in education, countries, such as China, have become wary of some disadvantages of edtech and have taken measures to tackle the problems raised by edtech in education. The Chinese government recently started issuing sweeping policies, guidelines,

and regulations to restrict the edtech industry. This is an attempt to tackle tech-enabled social issues that historically have exacerbated nationwide educational and social inequality, which, to a certain degree, has been reinforced during the COVID-19 pandemic and the lockdown experience. On 23 July, the Chinese Communist Party (CCP) mandated that existing private tutoring companies register as non-profit organisations, and that online tutoring agencies be subject to regulatory approval. China's latest move is in part a measure to reduce the pressure on parents and students in China's hyper-competitive education field and educational equality. The CCP official newspaper concludes online education has been "hijacked by capital", indicating the Chinese government's been wary about the private capital in the private education/ed-tech sector. Although there may be larger questions in regard to the reasons that the Chinese government may be taking such precautionary measures to mitigate the influence of edtech in the country, the nature of the policy reforms suggests a concerted effort to regulate the edtech industry.

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