Education during the Covid-19 crisis: Opportunities and constraints of using EdTech in low-income countries

La educación durante la crisis de Covid-19: oportunidades y limitaciones de usar EdTech en países de bajos ingresos

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Abstract

The Covid-19 pandemic has ushered in a period of educational disruption on an unprecedented scale. During this time of crisis, education will not be business as usual, and EdTech alone cannot close the learning gap. It will be dedicated teachers and resilient educators who will ensure learning doesn't stop — but they could be helped by the right EdTech tools. However, the digital divide means that internet and mobile network access varies greatly in middle and low-income countries. In this discussion paper, we explore some of the key constraints of using EdTech at scale to support education in low-income countries at a time of crisis, and highlight the opportunities that have so far emerged, in a rapidly-changing context. We draw upon evidence and examples to inform policy and programming decisions, moving from the initial emergency response to building resilience in the longer term, and planning to diagnose and treat the learning gaps that have emerged during the crisis.

Keywords: educational disruption by covid-19, EdTech, low-income countries

Resumen

La pandemia de Covid-19 ha marcado el comienzo de un período de interrupción educativa a una escala sin precedentes. Durante este tiempo de crisis, la educación no funcionará como de

costumbre y EdTech por sí sola no puede cerrar la brecha de aprendizaje. Serán maestros dedicados y educadores resilientes quienes se asegurarán de que el aprendizaje no se detenga, pero las herramientas de EdTech adecuadas podrían ayudarlos. Sin embargo, la brecha digital significa que el acceso a Internet y a las redes móviles varía mucho en los países de ingresos medios y bajos. En este documento de debate, exploramos algunas de las limitaciones clave de utilizar EdTech a escala para apoyar la educación en países de bajos ingresos en un momento de crisis, y destacamos las oportunidades que han surgido hasta ahora, en un contexto que cambia rápidamente. Nos basamos en la evidencia y los ejemplos para fundamentar las decisiones políticas y de programación, pasando de la respuesta de emergencia inicial a la construcción de resiliencia a largo plazo, y planificando para diagnosticar y tratar las brechas de aprendizaje que han surgido durante la crisis.

Palabras clave: disrupción educativa por COVID-19, Tecnología Educativa, países de bajos ingresos

Introduction

As Covid-19 swept across the globe in early 2020, school closures due to coronavirus began to affect learners worldwide. By the end of March 2020, over 180 countries had school closures in effect in at least some parts of the country. 99% of the world's population were affected by school closures over the course of 2020, 90% of which had at least some total nationwide closures (Hale et al., 2020; UIS, 2020; UNESCO, 2020a). Eight months later (November 2020), full closures have decreased to 24 country-wide closures affecting approximately 224 million learners (UNESCO, 2020a), although the full extent of disruption may be less clear now as partial reopenings and localised shutdowns occur in response to outbreaks. Figure 1 shows the proportion of the world's population living with nation-wide school closures at any point in time. From school closures due to previous health crises, such as Ebola outbreaks, the impact upon learners can be profound (Hallgarten, 2020). They lead to more school dropouts, leave learners at a higher risk of abuse, loss of confidence and self esteem, and decline in quality teaching and learning.

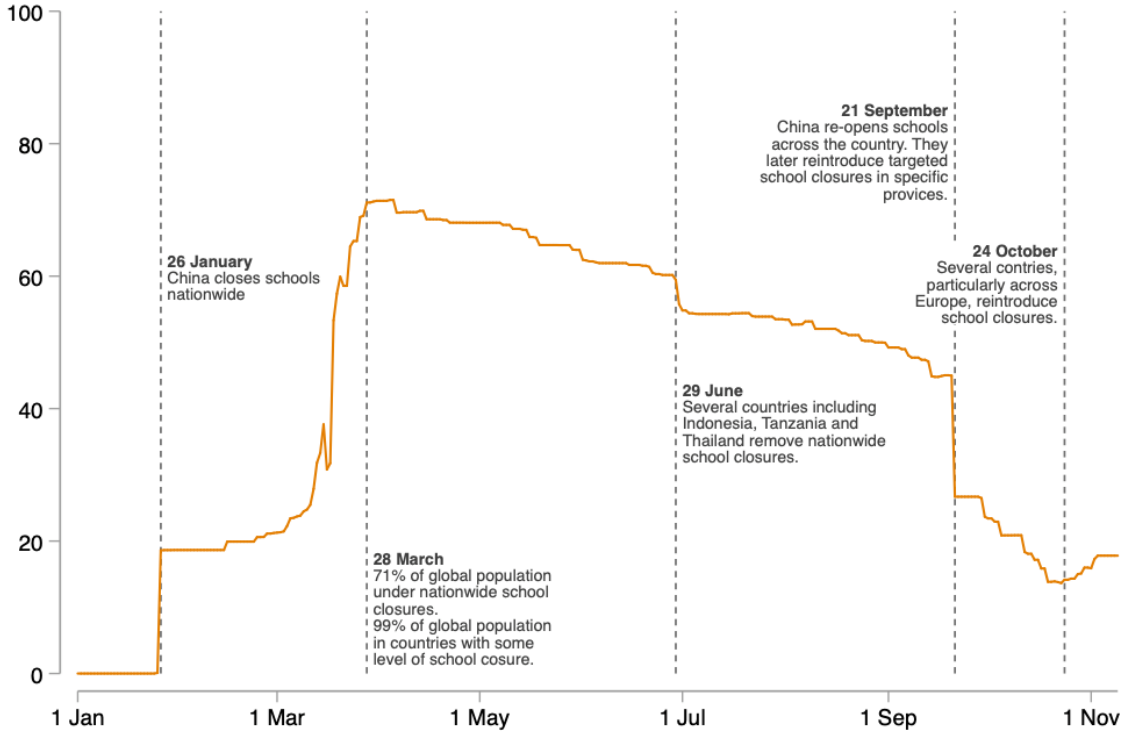

Figure 1: Percentage of population affected by nationwide Covid-19 school closures, global.

Widespread school closures prompted governments to take action to support learners in continuing their education remotely. In many cases, technology has played a role in responses, from individual teaching practices to country-wide responses (Vegas, 2020). There has been considerable variation in educational responses, as countries face multiple challenges as a result of the pandemic, including countrywide healthcare emergencies and economic recession. While a shift to online learning has been a common feature, this raises concerns about infrastructure, connectivity and the potential for responses to exacerbate inequities (Jordan, in press).

During this time of crisis, education will not be business-as-usual, and EdTech alone cannot close the gap. Education policymakers must be realistic — with or without EdTech, usual targets of learning will not be achieved. However, there is much that can be done, both to advance learning now, and to be better prepared to return to classrooms when school closures end; allowing teachers and learners to pick up from where learning will have got to and address gaps that will have emerged. To this end, countries need to manage their expectations of what can be done over the next months and year, by identifying the key political and technical constraints to educating learners remotely. Large investments in EdTech will deliver few results if not based on clear assessment of the limitations of the system (Pathways for Prosperity Commission, 2019a). The purpose of this discussion paper is to address this gap; first to consider the key constraints of using

EdTech at scale, and then drawing upon examples to outline potential ways in which EdTech can be used to support responses in low- and middle-income countries in the immediate and longer term.

What are the key constraints for using EdTech at scale?

The movement to out-of-school learning will exacerbate already weak education management and data collection systems. There is a reasonable amount of evidence in aggregate about the effects of school closures (UNESCO, 2020b). For example, it seems that numeracy and mathematics progression is particularly affected. What we know less about is whether distance learning and EdTech can help offset these negative consequences (Dahya, 2016; Tauson & Stannard, 2018). Most education systems around the world are decentralised which offers an opportunity to experiment with innovation and learn about different approaches (Glennie et al., 2020; You, 2020). It also presents the challenge of delegating decision-making authority. A core constraint, however, is the availability of local data and information to inform this decision-making. Without an operating footprint of schools to channel information up and down, policymakers have to be realistic. They are likely to have less information than what is normally available from weak education management and data collection systems meaning they will be unable to optimise their decisions.

Students' progression against formal curriculums will slow down. Country-wide school closures have happened very rapidly, leaving very little or no time for schools to prepare a strategy and transition to distance learning. Syllabuses which are exam-oriented are no longer fit for purpose as tests and examinations have been put on hold. Much of the curricula cannot be adapted quickly to teaching online (Graham & Sahlberg, 2020) and students face the anxiety of not knowing how their school year will progress (UNICEF, 2020a). As a result, exam-orientated progress will slow down for all learners. Certain groups of learners may be particularly affected such as primary school learners who are building the foundations for later learning (King, 2011), vulnerable learners (Giannini, 2020) or those supported by adults who often have not had access to a formal education themselves (UNESCO, 2020b).

Many children will not have access to technology or a suitable learning environment at home. The digital divide means that internet and mobile network access varies greatly in low income countries, for instance access to the internet is over 80% of the population in some Southeast Asian countries, but as low as 39% in Vietnam and some African countries (Jalli, 2020). The reality is that online learning will be easier for those with access and will exclude large groups of disadvantaged learners. A large number of learners may have no electricity, some will have a radio but not a television at home, others will have basic feature mobile phones but not smartphones, and others will have only low bandwidth internet available.

Teachers' ability to adapt to delivering education remotely will vary greatly (OECD, 2016). Some teachers will champion video conference lessons, keep in touch with their students on social media or SMS messaging and produce teaching materials. Others may feel overwhelmed if they are suddenly required to use technology new to them, and if they are held accountable to new standards. Education system managers must be aware of their teachers' levels of ability and set expectations accordingly. EdTech might remedy some of this — for instance through flexibly adapting materials to different technological channels of delivery or opening up channels to rapidly support struggling teachers through mentoring by teachers' educators — but teacher capability will be a core constraint, and cannot be quickly overcome. Developing the educational workforce is a key part of building resilience for the future (Save Our Future, 2020).

What are the opportunities of EdTech?

EdTech can help mitigate the effects of the educational crisis, but alone it is not the solution, and it will be difficult to scale up in a short time frame (World Bank, 2020). This is not the right time to invest heavily in new hardware, or entirely new curricula. Rather, we highlight what can be done within current constraints, with resources readily available, and with minimum levels of investment. We describe interventions that can improve outcomes in the short term (as part of immediate emergency responses, within weeks after school closures), and in the longer term (within one year, either while schools are still closed but potentially planning for reopening, or when countries will need to address the learning gaps that have emerged). The examples that we describe also represent some areas of support that teachers will need during the transition to distance learning in terms of knowledge and instruction skills. Ultimately, it will be dedicated teachers and resilient educators who will make sure learning doesn't stop — but they can be helped by the right EdTech tools.

Immediate responses

A simple grassroots platform where teachers can share their own EdTech solutions can be a quick start. One example is DIKSHA in India, a platform that has created a community of practice over recent years, hosting lesson plans and supporting materials uploaded by teachers and curated by a central authority (National Portal of India, 2020). The platform can help level the variable abilities of teachers to use EdTech, and can multiply the efforts of 'champion' teachers who create resources in local languages for local curricula. This can be complemented by tools that also provide direct feedback to teachers, such as the Tusome platform in Kenya which helped bridge learning gaps in resource-constrained settings where teachers struggled to reach targets (Filmer et al., 2020; RTI International, 2016). In the Covid-19 context, teachers should be encouraged to share practices that work on the internet, but low-tech options could be as simple as connecting small networks of isolated teachers by SMS (Jordan & Mitchell, 2020).

Broadcasting lessons through radio or television may help reach isolated students without internet access. By making use of existing infrastructure and cheaper technology, initiatives can be set up quickly, at scale and with little investment (Mundy & Hares, 2020). Broadcast media - television and radio, with programming also being made available online - has been a feature of Covid-19 responses in several low- and middle-income countries (Vegas, 2020). Educational television and radio provision have demonstrated benefits to learning for early days and primary school, and they also improve equity and can be cost effective (Damani & Mitchell, 2020; Watson, 2020; Watson, Hennessy & Vignoles, in press; Watson & McIntyre, 2020). Television lessons are already being used in Kenya in response to the current crisis (KICD, 2020), but there are wider examples for reference, from the classic Sesame Street to local programmes such as Know Zone in Kenya (Centre for Education Innovations, 2020), and Ubongo Kids in Tanzania (Ubongo, 2020). Similarly, radio-based instruction was used during periods of school closures during Ebola outbreaks (Damani & Mitchell, 2020). There is emerging evidence to suggest that using multiple modalities is effective in improving access to education in low- and middle-income countries during the crisis to-date (Dreesen et al., 2020).

The one-way transmission of information by radio or television can potentially be supplemented by communication using mobile phones. Evidence from a study conducted during the current crisis demonstrates that simple support to parents and learners - through SMS or telephone calls - can have a significant positive impact (Angrist et al., 2020). Broadcasts have been used in combination with SMS to communicate between educators and students (EDC, 2014), as well as peer networks of students (Mundy et al., 2014). The popularity of WhatsApp in low- and middle-income countries may lend itself to quickly form such groups. There are also EdTech apps being designed to work through basic feature phones and SMS messaging (such as textTETEA in Tanzania (Neumann & Wincewicz, 2016) or Eneza Education in Kenya, Ghana and Cote D'Ivoire (Eneza Education, 2020)) – and these will have a much broader reach than smartphone and tablet apps. In Sierra Leone and Liberia, the Rising Academy Network responded to the crisis quickly, by repurposing existing content for use through radio, television and SMS in the 'Rising on Air' programme (Lamba & Reimers, 2020). While television and radio lessons can have an immediate impact, countries should also learn from what works now and invest in producing television and/or radio materials to be prepared if schools remain closed the long term or for future crises.

Another useful response is to create an online one-stop-shop of resources that students can access directly or with the support of their parents. Educational resources are already available on the internet, such as the Khan Academy (Khan Academy, 2020). A wide range of open educational resources are freely available; distance courses for school-aged learners published under open licences such as British Columbia Open School may be rapidly repurposed (Open School BC, 2020). But policymakers must understand that online resources vary in quality and are rarely designed for local curricula, culture or language. Countries should invest in their own free resources for students and families and draw on partnerships with alternative or non-formal

providers to help strengthen digital learning materials — both in the immediate term and for long term preparedness. As noted above, providing only content that requires high bandwidth (such as videos) will not achieve much where access is limited. Rather, content will need to run on low bandwidth, offline or be accessible on basic feature mobile phones (the primary means to access the internet in many low-income countries; ITU, 2019).

Longer term planning

Over a prolonged period of school closure, keeping learners engaged is a significant challenge. The risk in the longer-term is that students will lose interest especially when parents do not have capacity to motivate them. Technology-mediated education has the potential to be 'gamified' to maintain learning over longer school closures. Countries and teachers directly can apply game-like elements to lessons and assignments, both online and on television and radio. This could include the addition of points, achievement badges or competitive leaderboards (Huang & Soman, 2013). There is emerging evidence that 'gamification' can be effective (de-Marcos et al., 2016). The simple message is that providing worksheets and syllabus books will achieve little by itself – a key part of the role of the teacher and the school environment is about motivating students. Remote learning solutions must try to fill this motivation gap. Meanwhile, countries should also foster a shared identity that benefits learning (Akerloff & Kranton, 2002). For instance, highlighting that it is crucial at this time for all to work together to overcome the danger of a generation losing out on their education and future economic prospects.

To cope with the educational crisis, within the next year policymakers will need essential data. Currently, countries do not have a sense of how to reach every child (what technology is available within each household), where the gaps are (how much each child has fallen behind), what is effective (what EdTech works in their local context: local-level solutions that schools, communities, and teachers designed to support the provision of education during the crisis) and what can improve equity (to overcome persistent problems of access to education; Graham & Sahlberg, 2020). One way to effectively gather data would be to use mobile phone-based apps where teachers can report information about the progress and needs of their students – and the app would then collate and display this data geographically. Already, UNICEF is mapping connectivity of schools worldwide (UNICEF, 2020b) - but the next step is to map the connectivity and learning needs of every student. When doing so, countries should plan to set good data standards across the system, to ensure compatibility, to match any microservices they acquire to their data systems, and to provide the right governance of data for their context, including data privacy considerations (Pathways for Prosperity Commission, 2019b).

In one year's time, having the right technology to 'diagnose and treat' learning gaps that have emerged during the crisis will make a substantive difference (Pathways for Prosperity Commission, 2019b). For example, in the Netherlands, data from the current pandemic illustrate

the extent of learning loss due to school closures, and how more marginalised learners are affected disproportionately (Engzell, Frey & Vehagen, 2020). Understanding the impacts in low- and middle-income countries will be critical (DeStefano, Piper & Stern, 2020). Digitalised personalised learning software already helps bridge learning gaps in low-income countries (Major & Francis, 2020; Muralidharan, Singh & Ganimian, 2019). Mindspark improved learners' scores in maths by 38% in India over 4.5 months (Mindspark, 2020). These tablet-based apps assess students' current level and give personalised lessons and exercises. They may also help gender disparities in learning. One such initiative 'onecourse' prevented a gender gap in reading and mathematics from surfacing amongst first-graders in Malawi (Onecourse, 2020; Pitchford, Chigeda & Hubber, 2019). There is potential for 'accelerated learning' principles to be applied to the use of EdTech as learners return to school (Damani, 2020). Countries need to start thinking now about taking action to stop emerging gaps (Pathways for Prosperity Commission, 2019a). To do this they must focus on how to acquire the right technology, adapt it to the local context and start rolling it out in phases, guided by feedback (Central Square Foundation gives guidance on these processes; Central Square Foundation, 2020). The good news is that once scaled up, these technologies can become relatively inexpensive (Muralidharan, Singh & Ganimian, 2019).

Conclusions

In this discussion paper, we have outlined some of the practical considerations around the role which EdTech can potentially play in supporting the continuation of education during the Covid-19 pandemic, from immediate school closures to a return to in-person teaching. We began this work in March 2020, at the global peak of emergency school closures (David et al., 2020). Since then, progress has been made in terms of immediate provision of distance and remote education, with multiple modalities encompassing a range of technologies proving a useful strategy particularly in low- and middle-income countries.

Looking at the crisis now, eight months later, while the field has moved beyond emergency responses, there is still a great deal of uncertainty around the course of the pandemic and planning for the future. Although many schools have reopened, further waves of the virus and localised outbreaks may yet prompt a return to closures. As testing and contact tracing initiatives are developed, schools may have to adapt to a hybrid model of being able to provide in-person education for some, while continuing to provide some remote provision to students who find themselves isolating (perhaps repeatedly). This underscores the need for building flexibility, resilience, and foresight capabilities into educational systems. Looking further to the future, calls for the crisis to be an opportunity to 'build back better' have gathered pace (Education Commission, 2020).

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