



Project synthesis note

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Ed-tech priorities for equity and inclusion

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Background

In the Global South, where access to traditional education is limited, the introduction of technology in education (ed-tech) promised to be transformative. However, for many young students, this promise remains elusive. Despite their tenacity, students face difficulties in navigating digital platforms, largely due to myriad structural challenges. A lack of reliable electricity, technological appliances, and internet connectivity, together with other systemic barriers such as a lack of proper teacher training, household characteristics, and challenges linked to political economy dynamics, make accessing digital learning tools a daily struggle.

This synthesis document explores the complexities of ed-tech use in the Global South, uncovering pressing challenges and opportunities linked to the unique contexts of these regions. It is based on three regional reviews and a global report of ed-tech use and policy across Africa, Asia and the Middle East and North Africa (MENA), and Latin America and the Caribbean (LAC). The document concludes by highlighting critical knowledge gaps which ought to be addressed to guide future ed-tech initiatives in the Global South aimed at promoting equitable and inclusive learning.

Scope of the studies

The regional studies underpinning this document explore the educational landscape of 31 countries, selected to represent diverse socio-economic, demographic, and cultural realities within low- and middle-income (LMIC) Global South countries. The studies include 10 countries from Africa,¹ 9 from Asia and MENA,² and 12 from LAC,³ allowing a nuanced, context-specific understanding of the ed-tech challenges and opportunities in these regions.

More than 200 ICT and ed-tech policies were reviewed through documentary analysis, while 27 specific programs implemented in primary and secondary schools were selected as in-depth case studies, using criteria such as programme success, cost-effectiveness or coverage, diversity of providers, scalability potential, and the extent of readily available background information.

The studies used a mixed-methods approach, employing secondary analysis of quantitative data for descriptive insights, together with a multi-method qualitative approach, comprising literature reviews, observations, and interviews. Field visits were conducted in Nigeria, Honduras, and Paraguay, providing on-the-ground perspectives, while at the national level interviews were carried out with 163 stakeholders across 29 countries, including government, non-government and private sector participants, as well as academics and regional experts.

Based on the regional reviews and expert consultations, the global report positions these findings at the global level, highlighting knowledge gaps on the evolving ed-tech landscape in LMICs, in the context of an increased global drive to accelerate the incorporation of technology in education.

Ed-tech for equitable and inclusive learning

Since our analysis centres around the promotion of equitable learning outcomes, it is imperative to first understand the foundational concepts of equity and inclusion. Equity in relation to education is defined as “fairness, justness, and impartiality” in education distribution across all levels (United Nations Educational, Scientific and Cultural Organization [UNESCO] Institute for Statistics, 2018, p. 17). Inclusion involves ensuring the active participation and shared achievement of all learners, by considering the unique needs of each individual. It recognises that every child has different characteristics, interests, abilities, and learning requirements, and that all children can acquire knowledge (UNESCO, 2020).

Equity and inclusion in relation to ed-tech emphasise the importance of providing equal access to online content, resources, and education for disadvantaged groups (UNESCO, 2023). This approach is grounded in the principles of the Universal Declaration of Human Rights (United Nations, 1948) and the International Covenant on Economic, Social and Cultural Rights (United Nations, 1966). In line with recent perspectives from UNESCO’s Global Education Monitoring report, this social justice framework now includes the “right to meaningful connectivity” alongside the right to education (UNESCO, 2023, p. 3).

For ed-tech to be effective in promoting equitable and inclusive learning in Global South countries, it must leverage existing opportunities that support disadvantaged student groups, while also confronting the challenges particular to it. The regional reviews and global report underscored that public-private partnerships, low-tech and offline solutions, the promotion of inclusive learning content, and teacher training in the use

¹ Benin, Cameroon, Kenya, Malawi, Nigeria, Senegal, Sierra Leone, South Africa, Tanzania, and Uganda.

² Cambodia, Egypt, India, Indonesia, Pakistan, Palestine, Sri Lanka, Tunisia, and Vietnam.

³ Bahamas, Bolivia, Colombia, Costa Rica, Dominican Republic, Honduras, Jamaica, Mexico, Panama, Paraguay, St. Vincent and the Grenadines, and Uruguay.

of ed-tech, offer substantial opportunities for the reduction of learning disparities. The renewed interest from stakeholders in the potential of digital learning following the Covid-19 pandemic, also surfaced as a critical opportunity to drive fairer ed-tech initiatives in the future across the three regions.

At the same time, there is a need for efforts to overcome the lack of ed-tech-specific policy, tackle limited funding and poor technological

infrastructure, and better navigate the political economy dynamics associated with digital education. The regional and global reports highlight that these are critical challenges to overcome in the path to a fairer educational landscape in Global South countries. Further demands include understanding how to reduce teacher apathy and limited capacity, as well as how to mitigate the impact of certain household characteristics on ed-tech adoption. These opportunities and challenges are described in the following sections.

Table 1. Driving equitable and inclusive technology-enabled learning in the Global South

Opportunities	Challenges
Public-private partnerships	Lack of ed-tech policy
Low-tech and offline solutions	Limited funding
Inclusive learning content	Poor infrastructure
Teacher training	Teacher enthusiasm and capacity
Renewed interest	Household characteristics
	Political economy factors

Note. Adapted by the authors from Adeniran et al. (2023), Castillo-Canales et al. (2023), and Vithanage et al. (2023)

Opportunities for driving equitable and inclusive technology-enabled learning

Public-private partnerships

Public-private partnerships have emerged as an important approach to dealing with the multi-dimensional nature of ed-tech interventions across the three regions. The regional and global reviews highlight the transformative power of these alliances to deliver equitable and inclusive learning opportunities through technology. Partnerships such as EDOBEST in Nigeria have demonstrated the potential of ed-tech to improve learning outcomes in public schools through the introduction of education management information systems, teacher training, tablets, and standardised lessons (Adeniran et al., 2023). Similarly in Asia, MENA, and

LAC, partnerships have been crucial in developing ed-tech initiatives that cater to marginalised and vulnerable student groups (Castillo-Canales et al., 2023; Vithanage et al., 2023).

These alliances have also served as a powerful strategy to advance technology-driven initiatives by leveraging the capacities of different actors in the ed-tech field. For instance, the success of the K-12 Egyptian Knowledge Bank (EKB) Study Portal has been partly attributed to its horizontal management structure, facilitated through a private-public partnership model that involves over 150 partners (Reimers & Opertti, 2021). From business owners working in collaboration with international non-profit organisations in Jamaica, Bahamas, and Costa Rica (Castillo-Canales et al., 2023), to multi-stakeholder partnerships operating in India, Cambodia, and Sri Lanka, to alliances between the

government and tech giants in the MENA region (Vithanage et al., 2023), partnerships have been effective across the regions in attracting alternative financing models for infrastructure development, promoting inclusive educational platforms, improving the quality of educational content, contributing to ed-tech uptake, and raising funds to expand their reach.

The regional and global reviews also evidenced the potential of partnerships to strengthen the resilience of education systems. The preparedness demonstrated by long-established ed-tech partnerships—such as those in Brazil, Uruguay, and Chile—was key in facing the challenges brought about by school closures during the Covid-19 pandemic (Castillo-Canales et al., 2023). Evidence from the LAC region also suggests that partnerships established by executive agreements (decrees) can help tackle the challenges associated with political transitions and instability. These agreements specify the roles and responsibilities of each stakeholder, and include a steering or advisory board that brings together representatives from academia, civil society, and the private sector. Such alliances not only provide a greater diversity of expert views for driving equity and inclusivity in ed-tech implementation, but have also shown to ensure sustainability across political transitions (Castillo-Canales et al., 2023).

Low-tech and offline solutions

Low-tech solutions present an important opportunity to reduce existing barriers faced by vulnerable groups in education. Mobile phones, especially in African countries, hold significant potential for bridging urban-rural and gender gaps, given their high penetration in rural households and relatively low gender divides in usage (Adeniran et al., 2023). Mobile penetration rates in the Asia region are also higher than the average for lower- and middle-income countries (Vithanage et al., 2023). The LAC report does not include specific mobile penetration data, but the region has been proactive in adopting other low-tech and offline solutions, such as educational TV channels dating back to 1968 (Castillo-Canales et al., 2023).

The program case studies also illustrate the efficacy of low-tech solutions, including mobile phones, TVs, and radios, in expanding educational access.



For example, the ConnectED programme in Botswana has shown that remote instruction through a combination of phone calls and SMS texts can reduce innumeracy by up to 31% at a cost of less than \$14 USD per child (Youth Impact, 2023). Similarly, the Nenasa initiative in Sri Lanka leveraged low-tech to make educational content available to rural students during the pandemic by connecting schools to the Nenasa TV channels (Dialog Foundation, n.d.). In LAC, low-tech solutions comprising the use of TVs or radios are currently being implemented in Paraguay, Uruguay, Mexico and Costa Rica, with all but one being implemented entirely by the government (Castillo-Canales et al., 2023).

Inclusive learning content

Inclusive learning content stands out as a particularly promising means to overcome the barriers faced by vulnerable groups in education. Numerous examples of inclusive ed-tech programs across Asia, MENA and LAC specifically target marginalised

groups, including children with disabilities, out-of-school youth, school dropouts, refugees, indigenous peoples and rural communities. In Africa however, there was a notable absence of interventions targeting these specific student groups, except for the Connect my School programme in Cameroon, Eneza Education in Kenya, and Mavis Talking Book in Nigeria (Adeniran et al., 2023).

Inclusive ed-tech programmes in Asia and MENA involve a combination of low- and high-tech tools, such as the provision of free pre-recorded and live education programmes to children with chronic health conditions and disabilities in Egypt, and uninterrupted access to online learning materials and resources for refugees in Palestine, as well as for girls who have been prevented from attending school due to early marriage, cultural norms or distance to school in Bangladesh, India and Pakistan (Vithanage et al., 2023). However, efforts to promote inclusive learning content in the region have largely been led by the private sector, raising concerns about the sustainability of inclusive education programmes.

In the LAC region, a particular focus is emerging on recognising the distinctive digital literacy needs and experiences of indigenous, bilingual, and intercultural communities (Méndez Cota & Lopez Cuenca, 2020). This framing has motivated participatory decision-making processes in digital inclusion policies in Mexico and Brazil (Castillo-Canales et al., 2023). In this way, indigenous and rural communities have been actively involved in leading digital initiatives that respond to their needs, including the establishment and management of infrastructure, services, and applications (Baca-Feldman et al., 2018). For example, technology has been leveraged to document and preserve indigenous languages through the co-creation of repositories (Méndez Cota & Lopez Cuenca, 2020). Such collaborations have been found to enhance the relevance and effectiveness of technology-driven initiatives, as they are more likely to reflect a community's unique ways of knowing and learning (Athayde et al., 2017).

Teacher training

Recent studies show that teachers who are well-trained in using ed-tech are more likely to integrate it effectively into their teaching, and to provide students with the support they need to use it

effectively (Mandal & Srinivas, 2022). Evidence on the positive impacts of improved ed-tech teacher training was found in Kenya, Sierra Leone, Malawi, Cameroon, Tanzania and Nigeria, through a combination of both public and private delivery mechanisms (Adeniran et al., 2023). In addition, the case studies from Honduras and Paraguay demonstrate opportunities to improve teachers' ICT capacity as well as their pedagogical skills through online courses and other virtual learning environments (Castillo-Canales et al., 2023).

Renewed interest

While ed-tech implementation faced challenges during Covid-19, the pandemic also renewed interest in leveraging ed-tech to support national learning systems across the three regions, and prompted a re-evaluation of existing assumptions around the integration of technology in education. Stemming from an increased awareness of educational gaps, some ed-tech companies in Asia and Africa innovated to modify existing products to serve users they could not reach prior to the pandemic (Adeniran et al., 2023; Vithanage et al., 2023). New efforts emerged to expand the geographical coverage of existing initiatives, and to launch new programmes incorporating multi-modal approaches, such as using offline technology to serve students from underprivileged areas, or delivering programmes in minority and sign languages (Vithanage et al., 2023). The ProFuturo regional initiative in LAC also expanded its teaching training model globally, and there has been a renewed emphasis on the importance of advancing digital literacy in the region (Castillo-Canales et al., 2023).

Challenges for leveraging ed-tech as a tool for inclusion and equity

Lack of ed-tech policy

The lack of specific ed-tech policy, vision and guidelines is a key barrier to ed-tech as an educational equaliser. Given the complex challenges associated with introducing technology into education systems, ed-tech-specific policy is essential (Burns, 2020). Countries in Africa with clear ed-tech plans such as Nigeria, Kenya, Rwanda, and South Africa have made more progress

in implementing ed-tech initiatives to reach marginalised learners, while others which lack clear ed-tech planning, such as Malawi, Senegal, Sierra Leone, Benin Republic, Cameroon, and Tanzania, are at different stages of adoption, and show varying degrees of success (Adeniran et al., 2023). Some LAC and MENA countries similarly suffer from an absence of policies, regulatory frameworks and legislation to promote the accessibility of online-based educational applications and content, which compounds the significant lag in digitalisation particularly observed in rural areas (Castillo-Canales et al., 2023; Vithanage et al., 2023).

Ed-tech policy priorities also vary widely according to context. For example, the poorest countries in Latin America have prioritised ensuring a reliable electricity supply in schools, while countries in the Caribbean recovering from natural disasters have focused on rebuilding infrastructure (Castillo-Canales et al., 2024).

Limited funding

The lack of adequate financing is a key barrier observed across all three regions. In Africa, countries have failed to allocate sufficient funding to ed-tech development (Adeniran et al., 2023). The region also faces challenges in raising private capital, with Africa's ed-tech sector receiving only \$20 million USD between 2019 and 2021, compared to total global financing of \$18.6 billion USD (UVU Africa, 2022). In South Asia, the sustainability of ongoing programmes has been threatened by limited available public and private funding (Vithanage et al., 2023). Authors of the regional review find a positive correlation between economic stability, digital infrastructure, education levels, and the adoption of ed-tech, a virtuous circle which implies a conundrum for LMICs which lack the money needed to attract more money. Financial constraints also pose a serious threat to the successful, equitable integration of ed-tech in the LAC region (Castillo-Canales et al., 2023). For example in Paraguay, school principals have had to source funds independently to pay for internet services. Ultimately, developing countries may not have the resources required to provide universal access to even the most affordable devices (Hilbert, 2010).

Poor infrastructure

Countries from the three regions have faced challenges in building the infrastructure needed for the equitable implementation of ed-tech policies. For instance, the Africa and LAC reviews found significant urban-rural gaps in the level of network, internet and electricity coverage between and within countries (Adeniran et al., 2023; Castillo-Canales et al., 2023). The case of the Digital Education Transformation National Programme (PNTED) in Honduras showed that the instability of the electricity supply in rural areas limited internet access among students and teachers who had received technological devices, although the program had worked well in urban schools (Castillo-Canales et al., 2023).

Similarly, in Egypt, Palestine and Tunisia, insufficient network coverage and a lack of high-speed internet have impeded the widespread adoption of ed-tech (Vithanage et al., 2023), while learners in LAC are mainly affected by inadequate ICT infrastructure in schools and households (Hilbert, 2010; Mateus et al., 2022). From Argentina to Ecuador, Chile, and Peru, education systems share similar technological limitations, with challenges including a lack of devices, and insufficient, unstable or slow connectivity (Castillo-Canales et al., 2023). The absence of adequate technological infrastructure is directly related to the limited resources of LMICs and, in some cases, also to the complex physical terrain and vast land mass—such as the case of Indonesia—which makes expanding network coverage more costly and time-consuming (Vithanage et al., 2023).

Teacher enthusiasm and capacity

Inadequate teacher training on the use of technology persists in many of the countries reviewed. Devising policies that effectively equip educators with a deep understanding of the pedagogical applications of ed-tech and the ways in which students engage with digital environments, remains a crucial challenge to leverage technology as a catalyst for learning in developing countries (Castillo-Canales et al., 2023). In addition to limited training, some teachers were somewhat hesitant to change, or disinterested in adopting ed-tech, indicating a degree of reluctance to embrace technology within schools. For instance,



senior teachers in Vietnam showed some level of resistance to upskilling, as they took longer to adopt online platforms and digital tools (Vithanage et al., 2023), while only 4% of teachers in Delhi, India reported regularly using technology and being committed to teaching through ICT (Mandal & Srinivas, 2022).

Household characteristics

Household characteristics play a key role in determining students' ability to learn through ed-tech outside school. For example, as explained before, the urban-rural digital divide across all three regions leads to unequal access to the devices needed to engage in remote learning. In LAC, factors such as socio-economic status and educational levels are closely linked to internet penetration, placing learners from poorer backgrounds at a disadvantage (Castillo-Canales et al., 2023). Cultural factors in Asia also prevented girls from accessing technological devices at home, thus perpetuating the digital gender divide (Vithanage et al., 2023).

Furthermore, experiences from the Covid-19 pandemic showed that parents were largely unprepared for, and struggled with homeschooling,

especially those with lower education levels (Adeniran et al., 2023; Vithanage et al., 2023). Moreover, in cases where an ed-tech solution is perceived as not aligned with cultural values, parents may resist its implementation (Adeniran et al., 2023). Overall, unsuitable conditions within the household, including lack of parental support, mean that at-risk children might benefit more from face-to-face instruction over remote options.

Political economy challenges

A plethora of political economy issues impeding the use of ed-tech as a tool for inclusion and equity were identified across the reports. First, political transitions have led to policy shifts and the disruption of projects already underway. For example, the rapid turnover of education ministers has resulted in inconsistent education policies in Nigeria (Olayinka, 2016). In Kenya, the drive to secure political power led to the launch of an overly ambitious "One Laptop Per Child" programme, a populist campaign move aimed at winning votes (Adeniran et al., 2023). These programmes eventually failed due to poor funding arrangements and sustainability plans (Muhamad, 2014). Similarly, political complexity and discontinuity in the LAC

region has been one of the greatest challenges facing ed-tech over the years. According to regional experts, efforts have largely been driven by specific people—called “visionaries” or “innovators”—who, on reaching a ministerial position, promote these policies (Castillo-Canales et al., 2023). Unfortunately, reliance on individual leaders means that all progress is lost with a change in administration.

Secondly, many countries across the regions lack the institutional capacity needed to carry out effective procurement operations. Examples from Bolivia, Ghana, Kenya and Paraguay demonstrated that limited expertise resulted in extensive delays, inconsistencies and faulty devices, which compromised the quality of ed-tech interventions (Adeniran et al., 2023; Castillo-Canales et al., 2023).

Finally, a lack of effective collaboration among stakeholders, including the absence of a shared vision, presents a major stumbling block in the successful implementation of ed-tech policies and programmes. In LAC, for example, conflicts arose in relation to the distribution of responsibilities between the public and private sectors (Castillo-Canales et al., 2023). Tension also emerged in relation to differing priorities, with private actors more concerned with generating profits, and public agencies with equity and inclusion. Reliance on international funding also meant that some state actors considered international cooperation to be driven by the interests and priorities of those agencies. Tensions in relation to the overall vision for ed-tech were also found within government institutions, with authors observing that some interviewees viewed technology as a lever for progress and development, while others perceived it as irrelevant for the LAC region.

Research priorities in ed-tech use and policy in the Global South

When it comes to leveraging ed-tech to promote learning equity and inclusion in the Global South, there is a need to strengthen and diversify the evidence base on what works, for whom, and why. Such knowledge is crucial for the effective allocation of resources towards a fairer distribution of educational opportunities (either through ed-tech or traditional forms of pedagogy), as well as to identify—and avoid—interventions that cause harm

to certain groups. Harnessing the unique contextual knowledge, networks and perspectives of Southern researchers is also decisive in building relevant initiatives that respond to their specific needs and circumstances. The global report identified three broad priority areas to be addressed in this regard.

Governance of ed-tech ecosystems

The regional reviews highlight a marked lack of research on ed-tech governance in LMICs (Cueto et al., 2023). Three critical gaps in knowledge must be addressed if a more nuanced understanding of current ed-tech ecosystem governance, and best practices pertinent to these contexts, is to be achieved. First, there is a need for in-depth studies mapping the range of actors and motivations involved, as well as what is required for ed-tech capacity to be developed. Second, comprehensive analyses comparing ed-tech policy frameworks and ecosystems across different countries are needed. Third, there is a lack of evidence on successful capacity development strategies in terms of global, regional, and national benchmarks and guidelines. Recognising and addressing these research gaps is imperative for advancing knowledge of, and strategies for ed-tech ecosystems governance, to support disadvantaged student groups and help bridge educational gaps in LMICs.

The pedagogical dimension of ed-tech

While progress has been made in some key research areas—including the implementation of active pedagogy with technology, and building teachers’ capacity—substantial evidence gaps persist around the pedagogical dimension of ed-tech (Cueto et al., 2023). Localised research is needed to understand the impact of teachers’ attitudes, individual characteristics, and social norms on technology adoption. Moreover, there is a lack of comprehensive research on the influence of individual, family, and community variables on technology use for education, the effectiveness of nudging interventions, and the development of contextualised pedagogical models, especially those involving artificial intelligence. There are also few studies on how ed-tech can address gender, intercultural or disability inequalities.

Furthermore, while some teachers and parents showed resistance to embracing ed-tech,

policymakers seemed to have an overly optimistic view on the effects of digital technologies on educational outcomes, despite the scarce evidence in this regard (Castillo-Canales et al., 2024). The potential adverse side effects of ed-tech interventions, and aspects related to pre-service education and in-service teacher professional development have not been sufficiently studied (Cueto et al., 2023). Addressing these research gaps is crucial for the development of knowledge and strategies that promote equity and inclusion among learners in LMICs.

Inequalities and vulnerability

There is a significant dearth of research relating to the impact of ed-tech on education systems in LMICs, where the use of technology may exacerbate existing disparities (Cueto et al., 2023). Research gaps include the absence of documented examples of effective interventions tailored to vulnerable groups, a lack of understanding regarding the costs and anticipated economic and social benefits of such interventions, and insufficient exploration of strategies to train and empower local stakeholders in developing programs for vulnerable communities. There is also a lack of research determining effective methods to integrate Universal Design for Learning (UDL) principles into ed-tech interventions, particularly for children with disabilities. Additionally, more research is needed on the mechanisms contributing to existing inequalities in specific countries or local contexts, along with the development of effective communication campaigns to challenge traditional stereotypes and negative attitudes toward the right to education for vulnerable groups. Addressing these research gaps is vital for formulating equitable and inclusive ed-tech policies in LMICs.

Conclusion

To advance equitable and inclusive learning in Global South countries, ed-tech initiatives must leverage existing opportunities that support disadvantaged student groups, while also confronting the challenges particular to their unique contexts. Building up public-private partnerships, low-tech and offline solutions, inclusive content, and teacher training are key opportunities for reducing learning disparities.

Addressing the lack of ed-tech policy, limited funding, and poor infrastructure, as well as efforts to transform teacher apathy and minimise the impact of household characteristics in digital learning are also necessary. In addition, implementing strategies to alleviate the effects of political transitions in the sustainability of ed-tech programmes, securing capacity building for procurement operations, and promoting a shared vision among stakeholders are crucial to facilitate the widespread adoption of technology-enabled learning. In order to achieve this, there is a need to strengthen and diversify Southern-led research on the governance of ed-tech ecosystems, the pedagogical applications of technology, and the impact of ed-tech on inequalities within education systems in LMICs. Only by addressing these research gaps can we attain a solid evidence base to formulate equitable and inclusive ed-tech policies in the Global South.

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Project synthesis note

Southern Voice is an open platform for think tanks that contributes to the global dialogue on the Sustainable Development Goals (SDGs). It does this by disseminating evidence-based policy analysis by researchers from the Global South.

This synthesis note summarises the lessons learned through the **Ed-tech initiative**, a collaborative project led by the Group for Analysis of Development (GRADE) and Southern Voice, in partnership with three leading Global South think tanks – CSEA, SUMMA and IPS. Using a mixed methods approach, we explored the main factors shaping the use, design, and governance of ed-tech in the Global South, seeking to uncover critical priorities to foster better and more equitable learning for all. The initiative was commissioned by the International Development Research Centre (IDRC) to provide insights into the ed-tech ecosystem in the developing world.

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