

Country-Level Research Review: EdTech in Bangladesh

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Notes

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Reviewers

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Acronyms and abbreviations

a2i	Aspire to Innovate
ADB	Asian Development Bank
BAFED	Bangladesh Forum for Educational Development
BALIKA	Bangladesh Association for Life Skills, Income and Knowledge for Adolescents
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BAU	Bangladesh Agricultural University
BdREN	Bangladesh Research and Education Network
BIDS	Bangladesh Institute of Development Studies
BNFE	Bureau of Non-Formal Education
BOU	Bangladesh Open University
BRAC	Bangladesh Rural Advancement Committee
BRAC-CAL	BRAC's Computer Aided Learning
BSSRP	Bangladesh COVID-19 School Sector Response Project
BUET	Bangladesh University of Engineering and Technology
C-DELTA	Commonwealth Digital Education Leadership Training in Action
CAL	Computer assisted learning
CAMPE	Campaign for Popular Education
CCT	Conditional Cash Transfers
CSO	Civil society organisation
DME	Directorate of Madrasah Education
DPE	Directorate of Primary Education
DSHE	Directorate of Secondary and Higher Education
ECE	Early Childhood Education

EFA	Education for All
EiA	English in Action
ELCG	Education Local Consultative Group
EMIS	Education Management Information System
ESP	Education Sector Plan
GPE	Global Partnership for Education
HEQEP	Higher Education Quality Enhancement Project
ICT	Information Computer Technology
IED	Institute of Education and Development
IER	Institute of Education and Research
LAYS	Learning Adjusted Years of Schooling
LDC	Localization of Digital Content
LMIC	Low- and middle-income country
MDG	Millennium Development Goal
MMC/TLCD	Multimedia Classrooms / Teacher-led Content Development initiative
MoE	Ministry of Education
MoPME	Ministry of Primary and Mass Education
NAEM	National Academy for Educational Management
NAPE	National Academy for Primary Education
NCTB	National Curriculum and Textbook Board
NFEMIS	Non-formal EMIS
NGO	Non-governmental organisation
ODL	Open and distance learning
OERs	Open Educational Resources
SDG	Sustainable Development Goal
SEND	Special Education Needs and Disabilities

SMS	Short message service
STEM	Science, technology, engineering and mathematics
TPD	Teacher Professional Development
UGC	University Grants Commission
UIS	UNESCO Institute for Statistics
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children’s Fund

Executive summary

This summary sets out some of the main findings from a review of EdTech research in Bangladesh. While the main purpose of the review is to provide insight into what literature exists in relation to EdTech in Bangladesh, a secondary purpose is to highlight factors that affect the production and use of evidence in decision-making. As set out in [Section 1](#), the report aims to highlight how EdTech Hub can meaningfully collaborate with researchers, practitioners, and policymakers going forward.

[Section 2](#) contextualises the education system in Bangladesh. While Bangladesh has made good progress towards increasing access to education (net enrolment in primary education is above 95%), the quality of learning is low. Prior to the Covid-19 pandemic, it was estimated that over half (58%) of learners who completed Grade 5 did not achieve the expected reading competencies. This figure is predicted to rise to 76% due to the effects of school closures ([Rahman & Ahmed, 2021](#)). Moreover, while access to education has improved, a large number of children and adolescents who remain out of school are from marginalised groups, e.g., children situated in urban slums and hard-to-reach areas ([UNICEF, n. d.](#)).

[Section 3](#) provides an overview of the EdTech research landscape in Bangladesh and illustrates both the paucity of existing research and its concentration around certain areas. For this review, we identified 62 papers that met the inclusion criteria for our study. Of these, approximately 60% focused on teacher professional development. This is partly explained by the high concentration of studies sourced that have researched donor-funded EdTech programmes, for instance, the English in Action (EiA) programme.

[Section 4](#) presents an overview of the research production landscape for the education sector within Bangladesh. The findings in this section highlight the importance of Civil Society Organisations as producers of research in the education sector. In comparison, higher education institutions are constrained by the lack of funding they receive for research, which in turn means that the quantity of research they produce generally tends to be low.

[Section 5](#) is organised thematically against EdTech Hub's five focus areas. It synthesises the literature identified in the scoping review according to these five themes. The main findings identified in [Section 5](#) by thematic area are as follows:

1. Technology to support personalised learning and teaching at the level of the learner

For this review, a total of five studies were identified that referenced education technology and its role in supporting personalised learning and teaching. These are empirical studies that reference the use of various technological devices used to promote learner-centred learning, including personalised approaches between learners and teachers. However, it is worth noting that these papers only allude to personalised learning. Personalised learning is not the primary focus of any of the papers reviewed for this section. The paucity of research in Bangladesh that relates to technology-supported personalised learning is a common feature of most low- and middle-income countries ([↑Major & Francis, 2020](#)).

2. (In-service) teacher professional development, structured pedagogy, and technology

A total of 38 studies that focused on teacher professional development met the inclusion criteria. Six themes emerged across these studies.

Among some of the noteworthy findings emanating from the literature were that technology-based teacher professional development initiatives — particularly those fostering communities of practice and involving digital content creation — have had a positive effect on teaching and learning. Moreover, teachers in Bangladesh were found to be using technology to engage in professional development outside of school hours.

A number of limitations and research gaps in this area were identified. Firstly, few studies adequately incorporated teacher voices into their design. A second limitation identified was the concentration in the literature on studies that focus on the role of EdTech for in-service rather than pre-service teacher training. Finally, research tended to include small sample sizes, mainly on pilot studies, rendering it difficult to understand the extent to which initiatives are sustainable, scalable, or replicable.

3. Technology to advance data use and decision-making in education

We identified only one study that related to the use of technology for data processes and decision-making in education. This is despite Bangladesh's 2010 National Education Policy emphasising the use of technology for data collection and analysis as a core objective ([↑MoE, 2010](#)). The dearth of studies suggests there is substantial opportunity for research on this area. This is particularly pertinent as Bangladesh is making efforts to expand and improve its education data systems, implying that there is potential buy-in and value

for research that analyses the role technology can have in facilitating these processes.

4. Technology to promote participation in school

A total of 11 studies identified for this review focused on the role of education technology to promote school participation. The themes around participation identified in the studies were largely focused on remote learning during the Covid-19 pandemic and technology to encourage school participation. However, with the exception of research that focused on remote learning during the Covid-19 pandemic, the themes emerging from these studies were disparate. Relatively few studies focused on the role of technology in helping the most marginalised groups to access education. Research into the use of technology to support the participation of children with special educational needs and disabilities (SEND) was found to be lacking. This is despite a situational analysis undertaken by [UNICEF \(2014\)](#), finding that just 11% of children with special educational needs in Bangladesh attended primary school (compared to the 97% national average). This problem also extends to refugees. Considering the large numbers of school-aged Rohingya refugees from neighbouring Myanmar, whom Bangladesh is currently hosting, a major limitation of literature focusing on EdTech and participation was the lack of emphasis on these groups.

5. Girls' education and technology

Ten studies had a focus on girls' education and technology. While studies demonstrated potential for the role of technology in helping to increase girls' access to education, there was comparatively less emphasis on what role educational technology has had on girls' learning.

A limitation relating to these studies was that the focus was on the broader category of 'women and girls,' rather than school-aged girls. This overlooks the unique challenges girls face as a result of the intersection of their age (as children) and sex (as female). Similarly, despite the gendered barriers to accessing educational technology being well documented within the global literature, the papers exploring this in the context of Bangladesh were found to not do so in enough depth.

[Section 6](#) explores structural issues relating to the generation and use of evidence in Bangladesh's education sector. These were based on interviews with key producers and users of EdTech research in Bangladesh. The findings reflect issues of importance for EdTech Hub in relation to current and future research and engagement in Bangladesh. Among the issues identified were the poor funding and limited capacity of higher education institutions to produce good quality research. One study found that of all the universities

operating in Bangladesh, half had not produced any research products whatsoever (↑[Rahman et al., 2019](#)). The dominance of donors providing funding both for research and the research infrastructure itself goes some way to explaining why EdTech research in Bangladesh has ended up being extremely concentrated on EdTech programmes implemented by donors. The interviews also highlighted how, since 2009, there has been a shift in demand for different sorts of evidence. This is reflected in the number of tools that the government has introduced to monitor the state of the education system in recent years. This includes the National Student Assessment, School Census and Annual Sector Performance Review.

[Section 7](#) concludes by articulating some of the gaps in EdTech research in Bangladesh, and where future research could be prioritised. During and after the Covid-19 pandemic, the role of EdTech in promoting access and participation to school or alternative educational opportunities is crucial. An important area of research with regard to this is the ability of parents to support their children's education. As has been illustrated throughout the Covid-19 pandemic, the participation of children in education is contingent on parental support.

Elsewhere, and in line with the Government of Bangladesh's priorities, understanding the role of EdTech in enhancing the knowledge and skills of teachers will be important going forward. This is especially true given the new curriculum, which the Government of Bangladesh plans to roll out in 2022, which emphasises the role of technology and teachers' skills. The areas identified in this review as research priorities relating to teacher professional development include: incorporating teachers' voices into research design; focusing more EdTech research on pre-service teacher trainees; and finally, examining what role EdTech can play in enhancing teaching practices to effectively reach the most disadvantaged groups.

The lack of research on the role of EdTech in aiding better data for decision-making also has significant potential. This is especially pertinent given that it aligns with current government priorities. Research to better understand the extent to which data collected and disseminated using technology can affect decisions related to education policy could be a valuable addition to EdTech research in Bangladesh.

1. Introduction

This review provides an overview of EdTech research in, and about, Bangladesh, in order to understand the opportunities for carrying out further research in the country, including how EdTech Hub can collaborate most effectively with researchers, practitioners, and policymakers. The report aims to provide value for researchers in Bangladesh and the surrounding region, as well as for EdTech implementers seeking to understand what evidence exists and where further research is needed. Through analysis of existing literature, discussions with key stakeholders and experts, and analysis of the broader political economy, the gaps in evidence that have the highest potential for impact on education are identified to inform future research priorities. With regard to the use of EdTech in Bangladesh, these priorities will also serve more broadly to foster and sustain conversation within a community of practice and learning shared by education stakeholders.

1.1. Structure

The review is made up of seven sections:

1. Introduction
2. Summary of the EdTech operating context
3. The texture of the EdTech research landscape
4. Key stakeholders within the EdTech research landscape
5. Summary of the academic evidence on EdTech
6. Summary of political economy analysis
7. Emerging priorities and opportunities for collaboration

1.2. Methodology

To address the aims of the review, we used a combination of approaches that draw upon a range of sources.

Analysis of statistics and policy documents informed the context ([Section 2](#)), and political economy analysis ([Section 6](#)). [Section 2](#), in particular, drew upon the experience of EdTech Hub's Country Engagement Team within the Bangladesh context. This has been developed through the Hub's ongoing work within the country; other research pieces developed by the Hub specifically in the context of Bangladesh ([↑Kaye, Chuang, et al., 2020](#); [↑Kaye,](#)

[Groeneveld, et al., 2020](#); [↑Sarwar et al., 2020](#)) and forging partnerships with key actors.

A review of the published academic research literature was undertaken to provide an overview of the existing research landscape around EdTech and education for school-aged learners in Bangladesh ([Section 3](#)). This provides an overview of trends — and current gaps — in addition to identifying key actors and projects. It also considers how existing research on EdTech in Bangladesh relates to EdTech Hub’s five research topics ([Section 5](#)). The research review also explored key stakeholders related to EdTech in Bangladesh ([Section 4](#)). The volume of EdTech-related research in Bangladesh has been increasing in recent years and we identified 62 publications for inclusion. The search process and its limitations are described in [Section 3](#).

Findings from discussions with stakeholders informed several aspects of the report, in particular, the political economy analysis ([Section 6](#)). Situating the priority research areas within the political economy analysis also brings a practical dimension. Potential directions for high-impact research in Bangladesh, aligned with the priorities within the country and with those identified by the Hub, are outlined in [Section 7](#).

2. Summary of the EdTech operating context

This section describes the operating context of Bangladesh's education sector. It begins with an overview of national contextual factors influencing education delivery in Bangladesh. This is followed by a description of primary and secondary education service delivery. The last subsection describes Bangladesh's education-related response to the Covid-19 pandemic. The section helps position subsequent insights into the EdTech research base.

2.1. Country context

With a population of 164.6 million people, Bangladesh is the eighth-most populous country in the world ([↑Worldometer, 2021b](#)). It is also the most densely populated of any country with more than two million residents ([↑World Population Review, 2021](#)). Living conditions are diverse. While more than 20 million people reside in the capital city, Dhaka, 63% of the population live in rural areas. These areas include the wetlands in the northeast of the country, the mountainous Chittagong hills in the southeast, and the western coast, which borders the Bay of Bengal. Each area faces unique environmental challenges, with cyclones common on the western coast, regular flooding in many parts of the country, and earthquakes also being increasingly common.

Over the last 10 years, Bangladesh has made excellent progress in addressing key development challenges. This has included a significant decrease in poverty (from 44% in 1991 to 15% in 2016), reductions in child and maternal mortality, improvements in nutrition, and enhancements in access to quality infrastructure and electricity ([↑World Bank, 2021a](#)). In 2020, Bangladesh had a Human Development Index (HDI) value of 0.632, ranking it 133 out of 189 countries and placing it within the medium category on the Human Development Index ([↑United Nations Development Programme, 2020a](#)). This contrasts with neighbouring countries such as Pakistan (HDI of 0.557 and ranked 154), Nepal (HDI of 0.602 and ranked 142) and India (HDI of 0.645 and ranked 131) ([↑United Nations Development Programme, 2020a](#)). Bangladesh's latest standing is an improvement from the 2019 results, when its HDI value was 0.614, ranking it 135 out of 189 nations, and a significant increase from its 2000 HDI value of 0.478 ([↑United Nations Development Programme, 2020b](#)). While Bangladesh has made progress in recent years, it is still working to overcome various challenges. Income inequality remains high. The top 1% of the population earn 15.8% of the national income while the bottom 50% earn 19.8% of it ([↑World Inequality Database, 2021](#)). Another area requiring attention is gender equality. The HDI for men (0.660) remains considerably higher than

that for women (0.596) ([↑United Nations Development Programme, 2020b](#)). More broadly, the current development priorities in Bangladesh include eradicating extreme poverty by 2031; reducing poverty to less than 3% by 2041, and promoting a skills-based economy ([↑Ministry of Planning, 2020](#)). Table 1 contains an overview of indicators that provide insight into Bangladesh's general development.

Table 1. Country overview.¹

Population indicators	Total population	In 2019, the population was 164.6 million. The growth rate is 1.04% per year
	Age	67.6% of the population is aged 15–64. 27.2% of the population is aged 0–14. Median age: 27.6 years
	Urban / Rural divide	Percentage of population — urban: 37.4% Percentage of population — rural: 62.6%
Development indicators	Human Development Index	0.632
	Life expectancy	72.3 years
	Fertility rate	2.036 births per woman
	Poverty	Percentage of population living in poverty: 14.3%
	Digital indicators	Mobile phones
	Internet	Internet penetration: 41%

2.2. Education in Bangladesh

Since 1990, Bangladesh's leaders have been focused on enhancing access to, and the quality of, education. Driven by international covenants including the Millennium Development Goals (MDGs), the Education For All (EFA) initiative, and more recently, the Sustainable Development Goals (SDG), the suite of

¹ Source: Adapted from [↑EdTech Hub, 2021](#); [↑United Nations Development Programme, 2020b](#); [↑World Bank, 2021c](#); [↑World Bank, 2021d](#); [↑World Bank, 2021e](#); [↑World Bank, 2021f](#); [↑World Bank, 2021g](#); [↑World Population Review, 2021](#); [↑Worldometer, 2021a](#); [↑Worldometer, 2021b](#).

policies and programmes listed below highlight the focus on education development since 1990 ([↑GPE, 2020a](#); [↑UNESCO, 2015](#)).

- Compulsory Primary Education Act 1990
- National Non-Formal Education Policy 2006
- National Education Policy 2010
- National Skill Development Policy 2011
- Vision 2021 / Perspective Plan 2011–21
- Comprehensive Early Childhood Care and Development Policy 2013
- Non-formal Education Act 2014

These documents now combine to form the foundations of education service provision in Bangladesh.

2.2.1. Education system governance

The oversight and governance of education in Bangladesh is undertaken by two main ministries ([↑Kaye et al., 2020](#)). The Ministry of Primary and Mass Education (MoPME) oversees primary education. The Ministry of Education (MoE) oversees both secondary and higher education. Implementation is led by four directorates. The Directorate of Primary Education (DPE) supports primary education, while the Directorate of Secondary and Higher Education (DSHE) is responsible for secondary education. The Directorate of Madrasah Education (DME) and Directorate of Technical Education (DTE) oversee implementation in their relevant areas.

In addition to these ministries and directorates, there are various other official bodies that support the delivery of education services in Bangladesh. These include, but are not limited to, the [National Academy for Primary Education](#)² (NAPE), the [National Curriculum and Textbook Board](#)³ (NCTB), [Bureau of Non-Formal Education](#)⁴ (BNFE), the Local Government Education Department, the [Bangladesh Bureau of Educational Information and Statistics](#) (BANBEIS)⁵ and many more. These institutions play unique but important roles in supporting various elements of education service delivery. These organisations, for the most part, report to one of the ministries mentioned above. [Aspire to innovate](#)⁶ (a2i), the Government of Bangladesh's digital public services agency is playing an increasingly important role in supporting

² For more information on NAPE, see <http://www.nape.gov.bd/site/view/publications/>.

³ For more information on the NCTB, see <http://www.nctb.gov.bd>.

⁴ For more information on the BNFE, see <http://bnfe.gov.bd>.

⁵ For more information on BANBEIS, see <http://www.banbeis.gov.bd>.

⁶ For more information on a2i, see <https://a2i.gov.bd>.

Bangladesh to consider how best to leverage new technologies and education innovations to enhance the quality of learning in the country.

2.2.2. Education system characteristics

Bangladesh's general education system comprises five main phases:

- Pre-primary education — Ages 5–6.
- Primary education — Ages 6–10
- Junior secondary education — Ages 11–13
- Secondary education — Aged 14–15
- Higher secondary education — Ages 16–18

Primary education between Grades 1 and 5 is free and compulsory for all Bangladeshi learners.

In addition to the above, both formal and non-formal education is provided to learners who are not enrolled in school through various government and non-government-led programmes. These opportunities are generally made available for learners aged approximately eight years and over. Table 2 contains key education service delivery indicators.

Table 2. *Key education service delivery indicators (2018–20).*⁷

Pre-primary	Learners	Total: 3.58 million Government: 1.13 million Other: 2.45 million Females: 1.79 million Males: 1.79 million Net enrolment: 94.2%
	Institutions	Total: 106,852 Government: 63,440 Other: 43,412
	Teachers	Total: 30,540

⁷ Source: Adapted from †Directorate of Primary Education, 2019; †Ministry of Primary and Mass Education & Directorate of Primary Education, 2020; †World Bank, 2021h; †World Bank, 2021i; †World Bank, 2021j; †World Bank, 2021k; †World Bank, 2021l.

Primary	Learners	Total: 17.3 million Government: 13.5 million Other: 3.8 million Females: 8.8 million Males: 8.5 million Net enrolment: 97.9%
	Institutions	Total: 134,147 Government: 75,345 Other: 58,802
	Teachers	Total: 685,400 Government: 374,738 Other: 310,662 Females: 426,651 (62.2%)
	Completion	Primary completion rate: 92.3%
Secondary	Learners	Total: 15.7 million Females: 52.6% Net enrolment: 66.6%
	Institutions	Total: Approximately 30,000
	Teachers	Total: 406,716 Female: 21.7%

While the snapshot of Bangladesh's education system provided in Table 2 provides insights into the current state of education provision, key insights that are not immediately apparent from the above statistics include the following.

Increase in early childhood education

Increasing access to early childhood education (ECE) has been a priority in recent years. The number of children enrolled in ECE has grown nearly 400% since 2010, with 93% of Grade 1 learners now attending pre-primary.

Gender

In Bangladesh, female enrolment exceeds male enrolment in both primary and secondary education. In primary education, 1.03 females are enrolled for every one male. In secondary education, the difference is far greater. Nearly

800,000 more girls (5,580,387) are enrolled than boys (4,750,308), resulting in a gender parity index of 1.17. ([↑BANBEIS, 2018](#); [↑MoPME, 2020](#)).

A lack of learning

While many children are now accessing education services, learning remains low. Prior to the Covid-19 pandemic, over half (58%) of learners who completed Grade 5 did not achieve the expected reading competencies ([↑Rahman & Ahmed, 2021](#)). Furthermore, analysis of the learning-adjusted years of schooling (LAYS) for Bangladeshi children indicates that a learner attending school from the age of 4 to 18 will only receive the equivalent of circa six years of actual learning. This lack of learning is linked to various factors including low levels of teacher training and development and the quality of teaching / learning materials. Worryingly, it is predicted that the number of LAYS may drop even further — to 5.3 — due to the negative impact of Covid-19 related school closures ([ibid.](#)).

Out-of-school-children

While access has improved, the size of Bangladesh's population means that many learners still remain out of school. A 2016 / 17 survey suggests that approximately three million learners aged between 6 and 14 years remain out of school ([↑Results for Development, 2020](#)). While this includes some learners who never enrol, this number is decreasing each year. Dropouts occur at various points including during primary school (18.6% of those enrolled drop out before the end of primary), after failing the primary education completion exam (circa 2.5%), and in transition to secondary (circa 5%) ([↑Directorate of Primary Education, 2019](#)).

2.2.3. Reform priorities

Bangladesh's 2020 education sector analysis sets out Bangladesh's current education reform priorities ([↑MoE, 2020](#)). The overarching goal of the plan is :

"To contribute to achieving the SDG4 goal of equitable, accessible and quality education towards building a sustainable and prosperous society and promoting lifelong learning for all, in line with the objective of Bangladesh becoming a developed country by 2041." ([ibid.](#), p. 11).

Efforts will be focused on three main priorities ([ibid.](#), p. 11):

1. **Access and equity** — to ensure compulsory basic education and to increase the scope for further education for all irrespective of gender, age, religion, ethnicity, and for disadvantaged groups.

2. **Quality and relevance** — to ensure learners at all levels acquire relevant knowledge, skills, attitudes, and values to live a healthy life, in harmony among people and with nature, and able to compete in the national and international job market.
3. **Governance and system management** — to strengthen results-based management systems for effective implementation of the Education Sector Plan (ESP), the eighth Five Year Plan and Sustainable Development Goal 4.

Further details on efforts to achieve these aims can be found in the education sector analysis ([↑MoE, 2020](#)).

2.3. Impact of Covid-19

The impact of Covid-19 has been particularly severe in Bangladesh. Schools first closed on 17 March 2020, and have yet to reopen. As of May 2021, the country is experiencing a new wave of infections.

Bangladesh was comparatively well-placed to respond to school closures and the shift to distance learning. Since 2010, Bangladesh has been working to develop a suite of distance education tools to provide hard-to-reach learners (e.g., those in slums, remote areas, refugee camps, etc.) with access to education. These tools include, but are not limited to ([↑Sarwar, et al., 2020](#)):

- The [Konnnect](#) platform, which provides millions of learners with thousands of pieces of learning content.⁸
- The [National Skills Portal](#), which offers content and live classes to technical and vocational learners.⁹
- [Muktopaath](#), which provides more than 1.4 million users with 180+ online courses and live classes.¹⁰
- [Teachers' Portal](#), which offers content and more than 1,00,000 online classes to primary and secondary level learners.¹¹
- The [Virtual Class](#) platform, which offers online live classes for tertiary-level learners.¹²

⁸ This information is available at <http://konnnect.edu.bd/>.

⁹ This information is available at <http://www.skills.gov.bd/>.

¹⁰ This information is available at <http://muktopaath.gov.bd/>.

¹¹ This information is available at www.teachers.gov.bd.

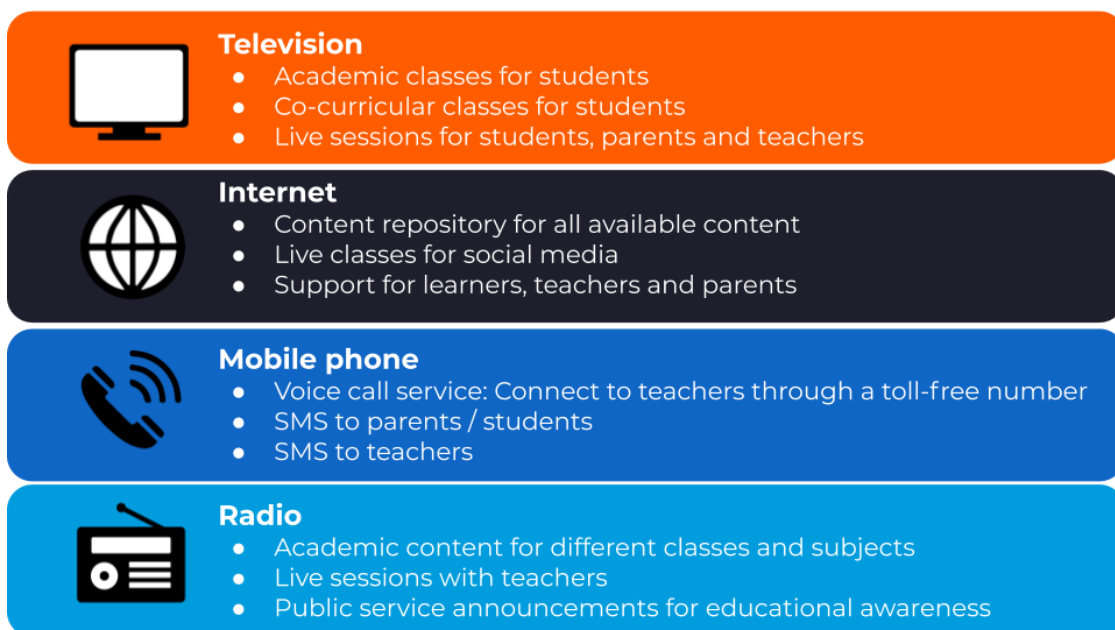
¹² This information is available at www.virtualclass.gov.bd.

The Bangladesh Covid-19 School Sector Response Project (BSSRP) lays out Bangladesh's plans to provide distance education services, which leverage these platforms ([↑World Bank, 2020](#)). The BSSRP comprises four components:

- **Component 1: Engaging in systemic response** supports the government to respond to school closures.
- **Component 2: Education system recovery** supports the government to implement a recovery strategy including school reopenings.
- **Component 3: Building system resilience** focuses on putting in place provisions to prepare for, and better react to, future shocks.
- **Component 4: Project management, results monitoring, and communication** manages and oversees the project's implementation.

In particular, the BSSRP has successfully facilitated the delivery of content to learners via various media. Figure 1 highlights the multiple modalities that are currently being used to support educational continuity.

Figure 1. Bangladesh's multi-modal response to Covid-19 ([↑Sarwar, et al., 2020](#)).



Despite being able to quickly respond to the school closures, Bangladesh is still finding it difficult to provide educational continuity. The Bangladesh Rural Advancement Committee (BRAC) recently conducted a rapid survey, which helped highlight various challenges. The survey notes that approximately 44% of learners are receiving guidance from schools on how to continue their studies ([↑BRAC, 2020](#)). Additionally, 19 % are not supported by their parents to undertake study at home.

Further challenges have been identified by the MoPME 'Covid-19 Response and Recovery Plan'. These include ([↑Sarwar, et al., 2020](#)):

- an inability to reach all learners, particularly the most marginalised;
- an inability to meet the educational needs of younger learners;
- a lack of experience using technology for education among both teachers and learners;
- resource constraints, which make it difficult to fund both existing and new distance approaches.

3. The texture of the research landscape on EdTech

This section provides an overview of the existing EdTech research landscape in Bangladesh. It presents a summary of how the search for EdTech research in Bangladesh was undertaken, together with some of the overarching characteristics of research that made the inclusion criteria. Section 3 also informs the discussion in [Section 5](#), which aligns the research against the five priority areas of EdTech Hub to better understand what the thematic priorities for future EdTech research in Bangladesh may be.

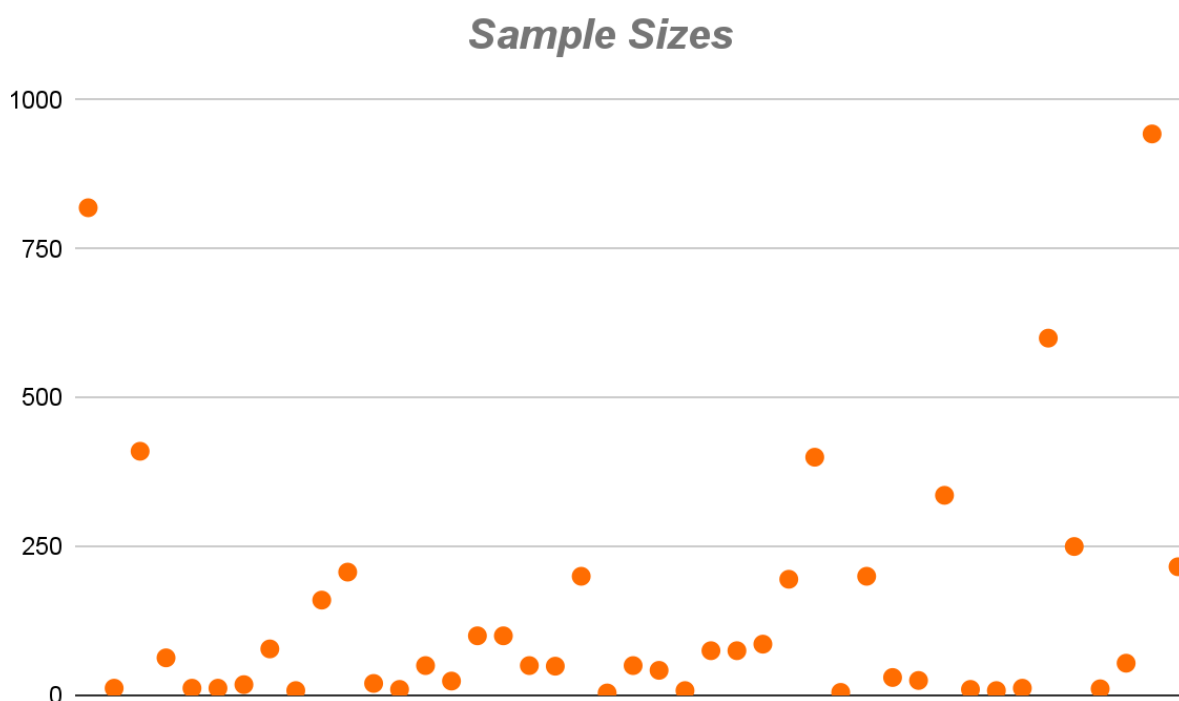
A strategic approach was adopted to search for published EdTech research. Given that ‘EdTech’ is an umbrella term that comprises a wide range of individual terms, approaches, technologies, and their synonyms, searches were conducted with a primary focus on Bangladesh. The search strategy included four aspects:

1. Initial searching of key EdTech research documents for Bangladesh-focused studies. This included existing reviews of EdTech studies in low- and middle-income countries (LMICs) (for example, [Rodriguez-Segura, 2020](#)), evidence reviews, and EdTech Hub publications. The Hub’s bibliographic database containing over 21,000 items was also utilised for the literature search undertaken for Bangladesh.
2. Searching specialist education research databases (ERIC, Academia.edu, ResearchGate) for Bangladesh-focused work and selecting those that met the eligibility criteria (publication since 2008; English-language; focusing broadly on EdTech; research conducted in and with a focus on Bangladesh [including by researchers based outside of Bangladesh]; focus on school-age learners, teachers, or aspects of the educational system relevant to school-age learners).
3. Automated searches of general academic databases (Google Scholar, ERIC) for Bangladesh *and* a range of EdTech-related terms (see [Annex 1](#)).
4. Snowball searches for further articles from authors identified as prominent in the literature, in addition to generic search engine searches to identify further potentially relevant information or ‘grey literature’.

For the literature search for this study (see [Annex 1](#) for a complete list of search terms used), 49 academic studies met the inclusion criteria together with an additional 13 studies from grey literature and non-academic sources.

Although there is an emergence of EdTech research in Bangladesh, the quality of these studies is often low. A range of design challenges reduces the reliability of the majority of these studies. Of the total studies, for instance, only four studies involved a sample size of over 1,000, and only three had a sample size of between 500 and 1,000. Similarly, few studies had statistically significant findings. Where studies involved large samples, the majority were survey-based (Figure 2).

Figure 2. Scatter chart of sample sizes¹³ in the articles included in the literature review.



This review also revealed the concentration of research around certain programmes, often initiated by donor partners. Of the total number of studies, approximately 10% focused on the English in Action (EiA) programme, which was a UK Aid-funded project to support English language development for teachers and learners in Bangladesh.

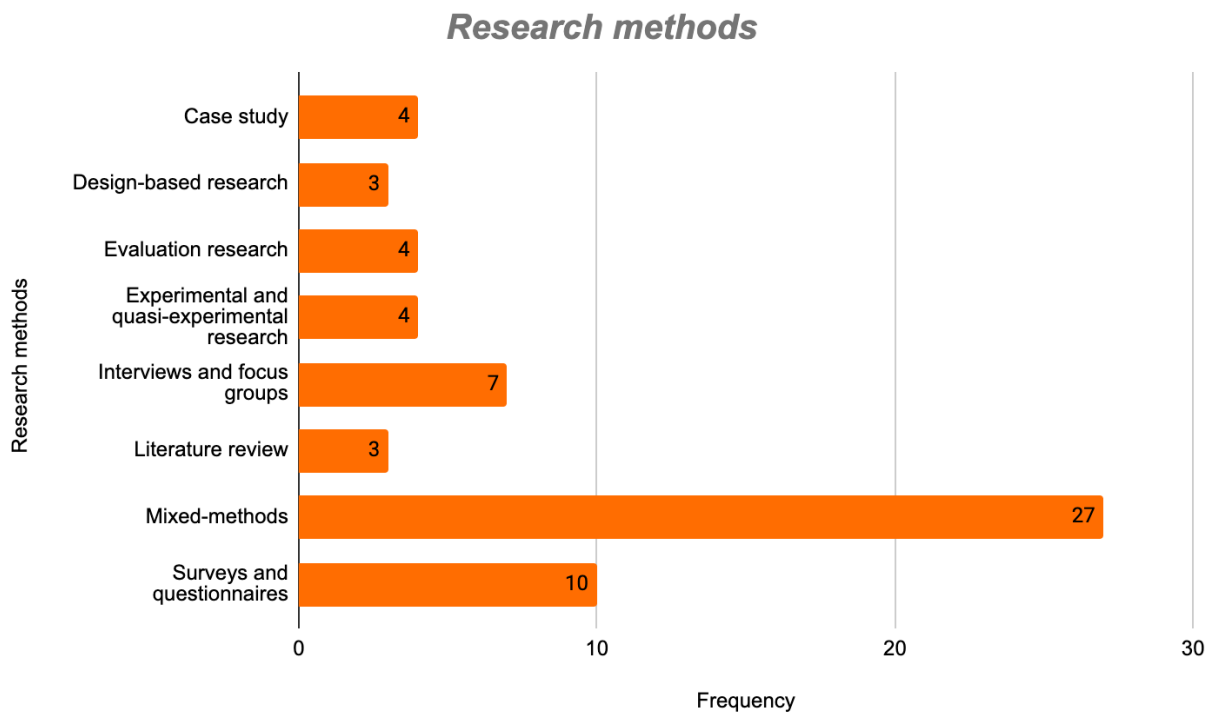
This supports a more broad finding that approximately 50% of all the studies included in this review involved researchers from outside of Bangladesh. The

¹³ Note that four papers, which used samples larger than 1,000, were not included in this chart (three surveys, $n = 2095$, 6153 , 7576 and a randomised control trial, $n = 9000$).

high proportion of donor-led research was corroborated in the stakeholder interviews (see [Section 6](#)). The dominance of the teacher-focused EiA research in the literature review also contributes to the skew in EdTech literature in Bangladesh focusing on teacher professional development (TPD) (60% of all studies).¹⁴

In terms of research methods, most studies employed a mixed-methods approach¹⁵ ($n = 27$), while the second-highest number of studies used either surveys or questionnaires ($n = 10$). A small number of studies utilised experimental designs ($n = 4$) and evaluations ($n = 4$) in their approach (Figure 3).

Figure 3. Frequency of research methods in the articles included in the literature review.



¹⁴ See [Annex 2](#) for more details.

¹⁵ Note that studies involving multiple methodologies were recorded as mixed-methods studies.

4. The key stakeholders within the research landscape on EdTech

This section explores the main people and organisations in Bangladesh involved in research on education more generally, and EdTech more specifically. The section is divided into two subsections, which provide a breakdown of the research landscape by area. These are:

- Academic institutions, government research institutes and independent organisations.
- The leading funders of research in the country.

4.1. Academic institutions, government research institutes and independent organisations

4.1.1. Academic institutions

As of 2017, the overwhelming majority of Bangladesh's 135 universities were private (95), with the remainder being public (37) (†[Hossain & Hoque, n. d.](#)). Private universities in Bangladesh, unlike public universities, are not entitled to receive any funding from government sources. On average, public universities receive 85% of their budget in the form of government grants (†[Chowdhury, Absar et al., 2020](#)). However, even for public universities, government funding for research remains low (even though in recent years it has been increasing from a low base).¹⁶ A more detailed discussion on funding for research within universities is discussed in [Section 4.2](#).

The more well-known institutions focusing on education research are given below.

The [Institute of Education and Research](#)¹⁷ (IER) — housed at the University of Dhaka — is the oldest higher education institute in Bangladesh focusing on education. Its main areas of research include, but are not restricted to, areas relating to curriculum development, instructional technology, and educational planning and management. It produces a bi-annual publication called *Teacher's World*, which publishes research undertaken by faculty members. However, a 2020 study found that the IER had not produced any major

¹⁶ Public spending to public universities for research in Bangladesh has been negligible, although this has, in recent years, been increasing. One estimate showed how this has grown from USD 0.45 million to USD 1.09 million between 2009 / 10 and 2015 / 16 (†[Rahman et al., 2019](#)).

¹⁷ For more information on the IER, see https://www.du.ac.bd/academic/department_item/IER.

research in the last six years with the last major bit of research taking place during 2006–2007 (↑[Momin, 2020](#)).

The [Institute of Education and Development](#)¹⁸ (IED) is housed within BRAC University, with a primary research focus on early years development and learning, together with primary and secondary education. The IED is the research arm of the BRAC non-governmental organisation (NGO). Together with the [Bangladesh Forum for Educational Development](#)¹⁹ (BAFED) and [Bangladesh's United Nations Educational, Scientific, and Cultural Organisation](#) (UNESCO) country office²⁰, the IED publishes the *Bangladesh Education Journal*, which is published once every two years. Specifically, in relation to EdTech, BRAC-IED has published several studies relating to EdTech interventions, which its sister organisation (BRAC) undertakes. This includes studies related to the BRAC Computer Assisted Learning (CAL) programme.

Besides research on EdTech, universities also utilise EdTech as a means of delivering education. The [Bangladesh Open University](#)²¹ (BOU) is one such university, delivering content through distance education. Prior to Covid-19, most universities in Bangladesh lacked the digital infrastructure needed to deliver classes remotely. However, the government moved quickly to get universities to deliver content digitally so that within four months, digitalisation was main-streamed across the higher education sector (↑[Rahman et al., 2020](#)).

4.1.2. Government research institutes

The government of Bangladesh has made efforts over the past decade to improve its education monitoring systems. In 2013, it passed the first Bangladesh Statistics Act and developed the National Strategy for the Development of Statistics (↑[Hossain et al., 2019](#)).

BANBEIS is situated within the MoE. It is currently responsible for the collection, analysis, and dissemination of education data across the whole sector and is in the process of developing a National Strategy for the Development of Educational Information Statistics (↑[GPE, 2020b](#)). BANBEIS is meant to report on SDG targets to the Unesco Institute of Statistics (UIS). Yet it has failed to meet these criteria for a number of years now (↑[GPE, 2020b](#)). Stakeholder interviews carried out in one study identified BANBEIS as having “overwhelming” workloads, with agencies within education ministries often being reluctant to cooperate with the department (↑[GPE, 2020b](#)).

¹⁸ For more information on the IED, see <http://www.bracied.com/research/>.

¹⁹ For more information on BAFED, see <https://www.bafed.net/home.php>.

²⁰ For more information on the UNESCO Bangladesh office, see <http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/access-by-region/asia-and-the-pacific/bangladesh/>.

²¹ For more information on BOU, see <https://www.bou.edu.bd>.

The [Bangladesh Bureau of Statistics](#)²² is located in the Ministry of Planning and with regional and *upazila* (sub-district) offices. It collects a range of data on demographic, social, and economic indicators.

a2i is a programme jointly supported by the United Nations Development Programme (UNDP) and United States Agency for International Development (USAID). The objective of this project is to support the aims of the Government of Bangladesh in helping to build a digital nation. Specifically, in relation to education, a2i's objective is about prioritising "ICT-led innovation to make education more enjoyable, accessible, and available [...] while enabling teachers to share and co-create content" ([a2i, n.d.](#)). It focuses on four areas. These are:

1. Multimedia classrooms — to create a more enjoyable environment in the classroom through the use of technology.
2. Teachers' Portal — to develop an online space for teachers to upload, share, extract, and comment on multimedia content.
3. Muktopaath, which is developing a national e-learning platform to promote learning anywhere, anytime, by anyone.
4. Multimedia talking books — to ensure that every single visually impaired person has access to education content.

Of the 62 studies which met the eligibility criteria for this review, three focused on one or more of these a2i programmes (see [Section 5](#) for more detail).

The [National Academy for Educational Management](#)²³ (NAEM), which was established in 1959, lists providing policy support to the MoE and conducting education research as its key responsibilities. As discussed in [Section 2.2.1](#), [NAPE](#), is a training institution that is responsible for training government primary school teachers. However, it is also a producer of educational research. While neither NAEM or NAPE produce research that is specific to EdTech, in 2018 NAPE did produce a report on the implementation of Information Computer Technology (ICT) in Bangladesh's government primary schools ([Haque et al., 2017](#)). More recently, it produced a report on the learning losses accrued due to Covid-19 ([NAPE & Room to Read, 2020](#)).

4.1.3. Civil society organisations and think tanks

A recent estimate indicated that there are approximately 250,000 civil society organisations (CSOs), which are registered under different government bodies,

²² For more information on the Bureau of Statistics, see <http://www.bbs.gov.bd>.

²³ For more information on NAEM, see http://old.naem.gov.bd/index.php?option=com_content&view=article&id=54

of which less than one-fifth are active (↑[USAID, 2019](#)). One study attributes the large number of CSOs to both the failure of the state to deliver on its development promises and the preference of aid agencies to channel aid through these agencies (↑[USAID, 2020](#)).

Some of the most well known and active CSOs working in the field of education in Bangladesh are as follows:

[Campaign for Popular Education](#)²⁴ (CAMPE) was formed in the immediate aftermath of the EFA declaration in 2000 and has grown to represent a coalition of over 1,300 NGOs. While these individual NGOs act as education providers, under the umbrella of CAMPE they focus on policy advocacy, campaigning, capacity building, and research.

A key report produced by CAMPE is the annual *Education Watch* report, which monitors the state of the education sector. CAMPE engages with government officials through the Education Local Consultative Group (ELCG), of which it is currently a member. It is at this forum that CAMPE presents priorities identified by its members, to government officials, to try and input into policy decisions (↑[Hoque, 2015](#)).

[BRAC](#)²⁵ supports interventions across a range of sectors, which includes education. Launched in 1985, BRAC's education programme focuses on reaching the most marginalised groups (those from poor households, rural areas, and girls) with a focus on pre-primary and primary education programmes, and non-formal education. BRAC was one of the first institutions in Bangladesh to incorporate ICT-based learning through its CAL programme (↑[Power et al., 2017](#)).

During the Covid-19 period, when schools were closed, BRAC piloted remote learning through the use of basic phones to reach learners attending BRAC schools (↑[Chowdhury, Islam et al., 2020](#)). The *Pasche Acchi* (Beside You) programme has provided BRAC beneficiaries with psychosocial support, while engaging children in learning through playful approaches over the phone (↑[Ahmad et al., 2020](#)).

The [Bangladesh Institute of Development Studies](#)²⁶ (BIDS) is a semi-autonomous multi-disciplinary organisation, which conducts policy-oriented research on development-oriented issues facing Bangladesh, including in the field of education.

²⁴ For more information on CAMPE, see <https://www.campebd.org>.

²⁵ For more information on BRAC, see <https://www.brac.net/program/education/>.

²⁶ For more information on BIDS, see <https://www.bids.org.bd>.

4.1.4. International donors

A number of donors are active in the education sector in Bangladesh. In 2019, the largest donors in the education sector, when considering volumes of aid spent, were the World Bank, Asian Development Bank (ADB), Germany, United Kingdom, Islamic Development Bank, and Japan ([↑OECD, 2021](#)). When it comes to EdTech more specifically, the United Nations Children’s Fund (UNICEF) and the World Bank have been particularly active in this space. During the school closures following the Covid-19 pandemic, UNICEF worked with the Government of Bangladesh in helping to implement remote learning programmes using TV, radio, mobile phones, and internet platforms ([↑UNICEF, 2020](#)). Similarly, the Government of Bangladesh, in consultation with the ELCG, developed a Covid-19 School Sector Response project, which was funded by the Global Partnership for Education (GPE). This supported remote learning and return to schooling using digital formats (television, mobile, radio, and online) to reach 2.5 million children ([↑World Bank, 2021b](#)).

Not only are donors important in terms of providing financial support to projects with an EdTech component, they are also an important resource for funding research in Bangladesh (see Section 4.2). Aside from funding research, however, they are also important producers of research that focuses on EdTech. During the period of Covid-19, for instance, UNICEF and World Bank released several high-profile pieces of research. Publications released by UNICEF focused on the role of radio technology in Cox’s Bazaar (the largest refugee camp for Rohingya refugees in Bangladesh), and how this affected education participation ([↑Ergül, 2020](#)). Elsewhere, the World Bank conducted studies during the school closures which focused on learner participation through TV-based interventions ([↑Ergül, 2020](#)) the impact of Covid-19 on learning loss ([↑Rahman & Sharma, 2021](#)), and the effect of remote learning on adolescent participation ([↑Baird et al., 2020](#)).

4.2. The leading funders of research in the country

Funding for research in Bangladesh’s universities has been grossly inadequate for several years, which, as we discuss in more detail in [Section 6.1.2](#), has led to the low production of research by universities. The University Grants Commission (UGC), which is a public body of all public, private, and international universities in Bangladesh, is the body which disburses research grants to public universities. According to the 2015 / 16 UGC Annual Report, just 0.5% of the grants that were disbursed to public universities was earmarked for research ([↑Rahman et al., 2019](#)). This is low when compared to its other South Asian neighbours, for whom the equivalent is 2% (*ibid.*). Moreover, of the public spending that is disbursed by the UGC to public universities, the

majority is for subject areas relating to business administration and engineering and technology (↑[Chowdhury, Absar et al., 2020](#)).

Against the backdrop of low domestic public spending on research in Bangladesh, most research funding appears to come from foreign institutions and governments. One study estimated that in 2015, 58% of all funding for research published by Bangladeshi researchers came from foreign institutes, followed by 20% from foreign governments. Just 8% of funding sources came from the Government of Bangladesh (↑[Rahman et al., 2019](#)). Aside from the funding challenges experienced by universities, elsewhere, this issue also extends to government institutions responsible for collecting data. BANBEIS (discussed above in [Section 4.1.2](#)) currently receives most of its funding from government resources. However, these resources are limited, meaning it struggles financially to carry out its activities. International funding to support BANBEIS activities is largely absent. One exception to this is the Korean Economic Development Cooperation Fund, which funds BANBEIS through loans in order to build its ICT capacity (↑[GPE, 2020b](#)).

Currently, as far as aid to education research in Bangladesh goes, UNICEF and the United Kingdom are the largest donors when it comes to resources spent. These two donors, along with Canada and Germany, reported spending USD 0.13 million on education research in Bangladesh in 2019 (↑[OECD, 2021](#)). However, aside from funding research, donors in Bangladesh are also funders of the infrastructure needed to produce good quality research. One prominent example of this relates to the World Bank Higher Education Quality Enhancement Project (HEQEP), which ran from 2009 to 2018. Over USD 90 million was earmarked over this period to improve the research environment in higher education institutions. Funds were disbursed through the Academic Innovation Fund and made available to both public and private universities. HEQEP also invested in achieving better connectivity between universities and research centres through the development of the [Bangladesh Research and Education Network](#)²⁷ (BdREN) (↑[Hossain, 2017](#)).

²⁷ For more information on BdREN, see <https://www.bdren.net.bd>.

5. Summary of the academic evidence on EdTech

This section presents the available literature on EdTech in Bangladesh. It is thematically organised and analysed around five key focus areas.

1. Technology to support personalised learning and teaching at the level of the learner.
2. (In-service) TPD, structured pedagogy, and technology.
3. Technology to advance data-use and decision-making in education.
4. Technology to promote access and participation in school.
5. Girls' education and technology.

Within these themes, the literature reviewed is organised according to where some existing literature was found to be available, but also what the limitations are of this existing research.

5.1. Technology to support personalised learning and teaching at the right level

Personalised learning refers to “the ways in which technology enables or supports learning based upon particular characteristics of relevance or importance to learners” (Major & Francis, 2020: p. 8). This is fast becoming an area of interest for researchers and practitioners working in the field of EdTech. However, as is the case for other LMICs, this review identified limited empirical evidence on the use of EdTech for personalised learning in Bangladesh.

While six papers identified for this review did make mention of or allude to personalised learning, it is important to note that personalised learning was not the focus of any paper, and the findings related to the topic are relatively light-touch. The wider applicability and transferability of these findings are, therefore, limited. The main themes identified from a review of the literature can be grouped around two themes: learner-centred learning and English language learning.

5.1.1. Learner-centred learning

Five papers present empirical evidence that alludes to the use of various technologies to promote learner-centred learning, including personalised approaches and interaction among learners and teachers.

Two papers mention personalised approaches (↑Parvin & Salam, 2015; ↑Cristol et al., 2019). Through mixed-methods research on technology-based English language learning in primary schools ($n = 15$), ↑Parvin & Salam (2015) find that audiovisual content played a “positive role in creating learner-oriented classrooms where it was possible to monitor learners’ actions and thinking processes” while alluding to how technology can be adapted to the level of each learner. ↑Cristol et al., (2019: p. 40) report that APTUS²⁸ (a Commonwealth of Learning project affording teachers and learners connections to learning without the need for electricity or internet access through a mini-PC) enabled “authentic learning experiences” for learning science, which were adapted to the contexts of learners ($n = 160$).

The literature reviewed also considers how EdTech can promote learner-centred learning through promoting interaction either between learners and their peers — through pair and group work (↑Shrestha, 2013; ↑Andersson & Hatakka, 2010), or between teachers and their learners (↑Sharmin & Roy, 2011; ↑Cristol et al., 2019).

The limited available evidence suggests that it is not straightforward to introduce learner-centred learning through technology (↑Cristol et al., 2019; ↑Andersson & Hatakka, 2010). ↑Sharmin & Roy (2011) argue that CAL projects should be implemented over a longer period of time (at least three years or more) in order to yield results and make it possible to evaluate their effectiveness in the longer term.

5.1.2. English language learning

Reflecting the dominance of the EiA programme in the literature sourced for this review, the discussion around the use of technology for personalised English language learning appears prominently (↑Sharmin & Roy, 2011; ↑Parvin & Salam, 2015; ↑Shrestha, 2013). The studies that examine EdTech initiatives tend to conclude that, despite challenges, Edtech demonstrates promise in supporting English language learning outcomes.

These studies, however, offer little examination as to why different technologies helped enable more effective learning in English language skills. This is in contrast to the study by ↑Sharmin & Roy (2011), which, when

²⁸ For more information on Aptus, see <https://www.col.org/services/knowledge-management/aptus>

examining outcomes of the BRAC-CAL programme, noted the ability to utilise local dialects was part of its success in making content understandable to a range of learners.

5.2. In-service TPD, structured pedagogy, and technology

Thirty-seven empirical studies on technology and teachers met the inclusion criteria for this review. Thematic analysis of the research articles we included had the following category frequencies.²⁹ A total of 13 publications were based on the analysis, assessment, and evaluation of technology-supported TPD initiatives involving different modalities and blended approaches. Other publications focused on using technology to increase access to TPD ($n = 10$), fostering content sharing and creation ($n = 3$), supporting teachers ($n = 15$), teachers' (and teacher educators') use of, perceptions towards, and readiness to adopt technology ($n = 13$), and the barriers to using technology for TPD in Bangladesh ($n = 4$).

Within Bangladesh's National Education Policy, technology use features throughout the teacher training section and includes an objective to "train teachers of all levels in information technology and to ensure wider use of IT to build up a modern and developed Bangladesh" (†MoE, 2010: p. 58). Moreover, technology and research studies form one of five areas of the Bachelor of Education Curriculum (†Chowdhury, 2012).

Findings from the research sourced for this review revealed that technology-supported TPD has, by and large, had positive impacts on teaching and learning in Bangladesh. However, much of this research was based on small samples for pilot studies. Moreover, the lack of research on the longer-term impact of initiatives renders it difficult to ascertain whether improved teaching practices have been sustained over time. Another limitation of many of the studies reviewed is the lack of information collected or analysed on the impact for different groups, such as women, rural-based teachers or teachers of learners with special educational needs and disabilities (SEND).

5.2.1. Technology to increase access to TPD

Some initiatives in Bangladesh have incorporated technology to widen accessibility to TPD. The BOU, for instance, provides distance teacher

²⁹ Note: themes are not mutually exclusive as there can be multiple themes contained within one publication. It should also be noted that literature on English in Action is similar in terms of thematic discussion and findings, e.g., conference papers are typically based on journal articles and programme reports.

education courses. While [↑Andersson & Hatakka's \(2010\)](#) study found that the use of mobile phones enabled distance interaction between teachers and peers, teacher survey respondents reported more recently that the one-directional communication through the BOU TV and radio programmes were unengaging and would benefit from greater interaction ([↑Parvin, 2017](#)).

Regarding in-service TPD, research has found that technology can be effective for providing TPD opportunities. A study on the EiA programme, for instance, concludes that pre-loaded mobile devices used became a “powerful tool as a medium of open and distance learning” ([↑Shohel & Banks, 2012: p. 31](#)). Teacher participants indicated that audio and video TPD content was more engaging than non-tech materials and provided greater accessibility for learning for both teacher and learners, for instance in use off-site ([↑Shohel & Kirkwood, 2012](#)). [↑Hansson et al., 2018](#) analysed use of the government-led Teachers' Portal — an online platform for teachers to network and share digital content — and found that approximately 90% of the 410 surveyed teachers used the portal at home and / or at night and 45.3% did so on weekends and during national holidays.

The discovery that teachers in Bangladesh are engaging in TPD outside of school hours suggests that they face time constraints and potentially a lack of development opportunities at school. This supports discussion from [↑Khan et al. \(2012\)](#), who detail the heavy workload experienced by teachers in Bangladesh, involving working multiple shifts and undertaking additional administrative tasks. Survey findings from multiple studies show that time is a significant barrier affecting the adoption of technology by teachers ([↑Ali, 2015](#); [↑Farhana & Chowdhury, 2019](#)). While the examples from the EiA and Teachers' Portal research demonstrate that technology can support access to TPD off-site, caution is required to ensure that initiatives do not exacerbate teachers' workload issues. Research on the Commonwealth Digital Education Leadership Training in Action (C-DELTA) pilot, for instance, details that some teachers lost enthusiasm and stopped participating as the initiative required them to support learners beyond school hours ([↑Khan, 2019](#)).

Technology has also been used to support TPD in remote / rural schools, where it has been reported that there is lack of ICT skills generally, especially among women ([↑Khan & Hasan, 2013](#)). Female teachers, in particular, were found to benefit from the the M-Learning programme — implemented in the Patuakhali, Noakhali, Thakurgaon, and Chittagong districts — as the distance learning (via smartphones and laptops) allowed engagement with professional development with minimal disruption to school and family commitments ([↑Imam, 2013](#)). Similarly, the previously discussed APTUS programme aimed to provide rural teachers access to digital learning platforms and content without the need for electricity or the internet ([↑Cristol](#)

et al., 2019). Research found that teacher training on technology-use and learner-centred pedagogical techniques resulted in higher post-test score differences between treatment ($n = 160$) and control ($n = 142$) groups. It should be noted that the treatment group had notably higher initial pretest scores implying potential selection bias. Nonetheless, the results point to potential for technology-based TPD to address infrastructural issues commonly encountered in rural areas of Bangladesh.

The studies on both M-Learning and APTUS programmes claimed they were cost-effective initiatives. However, no detailed cost information or analysis was provided. This renders it difficult to make assertions and comparisons for factors relating to cost, such as scalability or sustainability and highlights the need for more cost information to be provided.

5.2.2. TPD modalities and blended approaches

A total of 13 empirical studies researched technology-supported TPD initiatives involving various TPD modalities. Six papers focused on the EiA programme, which combined a blended approach of technology-based and face-to-face learning. Research evaluating the pilot ($n = 491$ teachers [350 primary and 141 secondary]) reported enhanced teaching practices and increased teacher and learner competencies in English language (↑Walsh et al., 2013). ↑Shohel & Banks' (2012) mixed-methods study on the pre-pilot revealed that the programme was effective because pre-loaded mobile devices enabled teachers to build confidence through practising English while simultaneously learning and applying innovative pedagogical strategies. Moreover, teachers' expressed how the video exemplars on technology devices provided them with a better understanding of communicative and participatory approaches to teaching and learning (↑Shohel & Kirkwood, 2012). A commonly cited benefit of blended TPD initiatives in Bangladesh generally, was that teachers were able to reflect (individually and with peers) on the application of learnt pedagogical techniques in classrooms (↑a2i, 2013; ↑Chowdhury et al., 2011; ↑Cristol et al., 2019; ↑Shohel & Kirkwood, 2012). This was a factor that contributed to increased learner-centred teaching across multiple initiatives. Little research, however, was discovered on technology-based initiatives for pre-service teachers in Bangladesh, making it difficult to assess what classroom-based opportunities — and how technology can support such TPD — are provided through initial teacher education programmes.

5.2.3. Technology for content creation and sharing

Enhancing teacher empowerment and agency can be achieved through promotion of technology-supported content creation and sharing. This review identified a total of three studies explicitly focusing on this area.

The Localization of Digital Content (LDC) project encouraged teachers — many of whom had not used a computer before — to adapt digital content and make presentations for use in class ([↑Chowdhury et al., 2011](#)). Evidence demonstrated that this led to teaching practice becoming more learner-centred and participatory, as teachers asked more open questions in class and used digital content to explain concepts and engage learners. Further evidence comes from the Multimedia Classrooms / Teacher-led Content Development initiative (MMC/TLCD), in which teachers were trained to create technology-supported educational content and electronic versions of textbooks ([↑a2i, 2013](#)). The a2i report discovered that 196 out of 208 teachers interviewed had created and uploaded more than 300 e-books across primary and secondary levels since the start of the initiative. This contributed to increased teacher knowledge, skills, and creativity, in addition to higher learner motivation and attendance and better exam results. In a study on the use of the Teachers' Portal, 88% of the 410 teachers surveyed (across all 7 divisions and 64 districts) stated that they uploaded their own created content, and 94.7% downloaded editable content by other teachers ([↑Hansson et al., 2018](#)). It was also reported that sharing content and providing feedback to other teachers through the portal led to enhancement of teachers' creativity and efficiency, as well as self-confidence. [↑Chowdhury, \(2012\)](#) found that information sharing and content creation led to contextually relevant knowledge development within teacher education in Bangladesh.

While the benefits of enabling teachers to create their own content are documented, teachers in multiple studies reported that such processes can be time-consuming ([↑a2i, 2013](#); [↑Hansson et al., 2018](#)). Moreover, teachers from the MMC / TLCD initiative stated they experienced uncertainty and felt extra pressure to produce content ([↑a2i, 2013](#)). These factors suggest there is a need for TPD initiatives in Bangladesh to support teachers in the creation of content through providing necessary time and training opportunities for skills development.

5.2.4. Technology to foster support and communities of practice

Providing support to teachers is an effective means of enhancing TPD ([↑Leu & Price-Rom, 2006](#)). This can include the facilitation of peer engagement and wider networks of learning (communities of practice), as well as external support from coaches, mentors, and other programme and institutional actors. In Bangladesh, there has historically been a lack of support, collaboration, or sharing of knowledge or experiences among teachers ([↑Shohel & Kirkwood, 2012](#)). This review found several examples of research exploring how technology has been used to provide support to teachers.

[↑Hansson et al.'s \(2018\)](#) study on the Teachers' Portal, for instance, found that in addition to learning from others' content (78.2%), teachers also reported that

they provide feedback to other teachers (58.8%), and furthermore, 62% of respondents stated that the portal contributed to their skills development, specifically through networking and sharing. The C-DELTA initiative involved training “tech-champion” teachers ($n = 30$) from five districts to return to their institutions to promote the use of an online platform containing digital resources and courses (↑[Khan, 2019](#)). Research found that teachers provided greater support to learners through using social network platforms to communicate and be more responsive.

There were also various examples of regular external support and follow-up provided to teachers through technology-based TPD initiatives (↑[Chowdhury et al., 2011](#); ↑[Imam, 2013](#)). The cluster meetings and visits from EiA programme staff, for instance, created a support network that contributed to establishing stronger relationships between teachers and trainers (↑[Shohel & Banks, 2012](#)). As technology-supported TPD is a relatively nascent practice in parts of Bangladesh, providing support and opportunities to share feedback and reflect is vital for tech-based initiatives to be adopted and effectively enhance teachers’ development. It is also important that follow-up from initiatives is constructive and progressive. Teachers from the BRAC-CAL project, for instance, reported that — despite face-to-face sessions continuing years after initial training — these follow-up sessions did not add much value, as they did not develop beyond training on technology use (↑[Power et al., 2017](#)). This demonstrates the importance of ensuring that support incorporates teachers’ voices and iteratively evolves to meet their developing professional needs.

5.2.5. Teachers’ technology attitudes, adoption, and use

Teachers’ attitudes and perceptions toward technology use can have a significant impact on how they apply it to their practice, both for TPD and for utilising it for teaching and learning processes (↑[Tondeur et al., 2017](#)). The reportedly effective APTUS project, for example, involved teachers who already had a “high degree of interest” in applying technology for learning, which impacted their motivation for the initiative (↑[Cristol et al., 2019: p. 41](#)).

A number of studies examined teachers’ ($n = 10$) and teacher educators’ ($n = 3$) attitudes, adoption, and use of technology through survey-based research. It has been reported that teachers in Bangladesh have historically held a negative view of technology. ↑[Khan & Hasan, 2013](#), for instance, discuss a study from 2005 in which teachers were reported as being unconvinced of the benefits of technology application in teaching and learning processes. More recent studies, however, report more positive attitudes, including across gender (↑[Kashem & Haque, 2014](#); ↑[Mia & Haque, 2013](#)) and urban and rural areas (↑[Ali, 2015](#)), as well as age and level of profession (↑[Mia & Haque, 2013](#)). Teachers have also been found to have higher access rates to technology and an internet connection compared to national population averages, e.g., 35% of

teachers have access to a computer at home compared to 8% of the population (Farhana & Chowdhury's (2019)).

Despite increased access to technology and connectivity, Khan & Kuddus' (2020) survey analysis ($n = 100$) details that teachers cited a lack of adequate skills (79%) and training (83%), and insufficient support (81%) as challenges to using technology. Looking further into the frequency with which teachers apply technology to their teaching practice, two studies surveying secondary teachers found that 40%–60% of respondents used computers and the internet daily / multiple times a week, with around a quarter using computers for more than three hours each day (Farhana & Chowdhury, 2019; Kashem & Haque, 2014). Additionally, 15–25% of teachers were found to “barely or rarely” use computers or the internet. Mia & Haque (2013) found similar rates to these among primary teachers, whereas a different study ($n = 200$) found that 79% of rural and 65% of urban primary teachers never used technology (Ali, 2015). This implies there would be value for research to provide a more comprehensive and granular understanding of technology adoption and attitudes to it across different education levels, contexts, and teacher demographics. Shamim Miah et al. (2020), for instance, suggest that teachers with over 11 years of experience represent the majority group in Bangladesh and that they are less likely to use technology than their younger peers. Additionally, a study on the government-led Teachers' Portal discovered that teachers who were younger and teaching science and ICT subjects used the platform more (Hansson et al., 2018).

5.2.6. Barriers in utilising technology for TPD

Of the reviewed literature looking at technology to support TPD, four studies explicitly considered the barriers to, and implications for, technology use among teachers in Bangladesh, in addition to other studies exploring barriers as a secondary theme. As noted in Section 5.2.5, these included results from teacher surveys that a lack of training opportunities and poor infrastructure impede teachers' opportunities to incorporate technology into teaching practice (Chowdhury, 2012; Farhana & Chowdhury, 2019; Farhana et al., 2020; Kashem & Haque, 2014). Further survey research on the Teachers' Portal, for instance, concluded that internet speed and cost, insufficient availability of equipment, and power failure were among some of the problems impacting teachers' effective use of the platform (Hansson et al., 2018). These issues are commonly reported within research on TPD in Bangladesh and can cause teachers to divert from using technology. An example of this comes from the C-DELTA initiative whereby slow internet speed led teachers to stop using the online platform (Khan, 2019).

A recent government report highlights the need to enhance teacher educators' ICT training (MoE, 2019). Research on teacher educators has

pinpointed that English-embedded educational software can make use difficult for teachers and teacher educators with low levels of English competency ([↑Chowdhury, 2012](#); [↑Talukder, 2015](#)). This highlights the importance of providing training, support, and technology devices and materials in contextually appropriate languages. For instance, the LDC initiative achieved this through increasing the availability of Bangla digital resources ([↑Chowdhury et al., 2011](#)). Additional issues at the teacher educator level include a lack of pedagogical knowledge to prepare teachers for technology use ([↑Chowdhury, 2012](#)), the teacher education curriculum not being well-aligned to ICT-based teaching ([↑Talukder, 2015](#)), and a lack of tutorial and administrative support for ICT-based programmes at university ([↑Talukder, 2015](#)). Overall, a gap exists between policy vision on technology application and the capabilities of teacher educators for effective implementation ([↑Chowdhury, 2012](#)).

A final issue identified in relation to technology-based TPD initiatives concerns sustainability. The programme research on EiA pilots, for instance, identified various sustainability challenges, which included infrastructure difficulties for rural teachers, maintaining teacher motivation, user-friendliness of technology, and aligning TPD with the national curriculum ([↑Shrestha, 2012](#)). [↑Rahman, et al. \(2019: p. 10\)](#) suggest the “hyper-success claims” made by research and reports on the EiA programme following scale-up are not supported by recent independent studies. These highlight several issues, including shortages of teacher trainers, infrequency of training, inequitable opportunities for rural teachers, and ineffective training materials. [↑Karim et al. \(2017\)](#) further argue that the EiA programme could have benefitted from greater teacher reflection. Additional research undertaking classroom observations of EiA-trained teachers concluded that teaching methods were inconsistent and failed to incorporate the pedagogical techniques — such as communicative approaches — EiA aimed to promote ([↑Karim & Mohamed, 2019](#)). From the total number of studies in the TPD literature identified in this review, 13 studies (of which EiA accounted for six) researched pilots of technology-supported TPD initiatives. This suggests that the sustainability of programmes could have benefitted from more consistent research into longer-term impact and from continuously identifying and addressing challenges.

5.3. Technology to advance data use and decision-making in education

The use of technology for data collection and processing was cited as an objective in the National Education Policy 2010 ([↑MoE, 2010](#)), and recent analysis suggests that ICT systems that capture data are gradually expanding,

with developments including technology training for teachers, online data collection systems (e.g., Geographic Information System school mapping), and the establishment of ICT centres in 125 *upazilas* (↑GPE, 2020b).

Throughout the reviewed literature, there are examples of technology used to facilitate data collection in Bangladesh. For instance, multiple Covid-19 reports utilised telephone and online surveys to connect to stakeholders (↑a2i, 2020; ↑Asadullah et al., 2020; ↑Biswas et al., 2020). We found examples of software being used for data collection (↑BBS, 2019), and a government report on a multi-sector cluster survey used tablets and Bluetooth to facilitate data collection activities (↑BBS, 2019). While technology is being used for data collection, there is limited research assessing the use of technology for data processes or analysing its impact on decision-making. This finding is reflected more broadly through the lack of analytical research on Bangladesh education data. For instance, there had been no comprehensive assessment of Bangladesh's Education Management Information System (EMIS) at the time when ↑GPE (2020b) published a recent evaluation report.

5.3.1. Data collection

We found no research directly analysing EdTech's contribution to data collection activities in Bangladesh. Stakeholders interviewed for this review confirmed that technology is used in data collection processes. This includes EMIS processes directly collecting teacher and institutional data online as well as the Multimedia Classroom Dashboard (MMCD) — also known as a Digital Monitoring System (DMS) — that collects data on ICT use at the school level and a connected app enables monitoring and mentoring officers to submit online data. Nonetheless, a recent report found the decentralised EMIS to be fragmented among sub-sectors and there to be poor capacity for data collection and monitoring at school, district, and *upazila* levels (↑GPE, 2020b: p. 45). Furthermore, a BANBEIS report found record-keeping by institutions to be “weak and unsystematic”, resulting in inadequate data collection processes (↑GPE, 2020b: p. 47). The government plans to address monitoring capacity issues by supporting more actors involved in EMIS processes (↑GPE, 2020b). The BNFE, for instance, have engaged local NGOs to support data collection and have also received assistance from UNESCO to develop non-formal EMIS (NFEMIS), which includes a framework for an online NFEMIS (↑GPE, 2020b). Furthermore, BANBEIS is working with UNESCO to conduct data gap analysis, create indicator frameworks, and undertake data mapping (↑GPE, 2020b). This suggests that evidence on the use of EdTech for data collection would be a valuable resource for the education system in Bangladesh to help identify both the further potential and the challenges that technology presents.

A recent government report has highlighted the importance of encouraging officials to use ICT to enhance transparency, accountability, and efficiency ([↑MoE, 2019](#)). In a study conducted by [↑Roy & Miah \(2018\)](#), open data initiatives for primary schools were found to have helped improve transparency and accountability in the management of the education system. In being able to access school data, parents and school management committees were able to play a more active role in holding schools to account. This related not only to learning outcomes but also to school facilities and teacher attendance. Despite the positive impact, the report found that poor internet and computer facilities limited the data collection possibilities, suggesting that improving ICT infrastructure could enhance data collection processes. It was also discovered that communities in poor and rural areas had fewer opportunities to access education data and that parents with low literacy levels were largely dependent on knowledge sharing through informal meetings ([↑Roy & Miah, 2018](#)). As wider stakeholders are often not involved in sub-sector planning in Bangladesh ([↑GPE, 2020b](#)), the findings from [↑Roy & Miah's \(2018\)](#) study imply that decisions involving EdTech must incorporate a wide range of stakeholder needs to contribute to more effective data systems.

5.3.2. Data analysis

We discovered no research that explores how EdTech influences data analysis for educational policy or practice. Examples of technology-supported tools for data analysis include [Geodash](#) (it provides geospatial education data) and the EMIS data made available through the BANBEIS website. The websites of various government departments are nonetheless not user-friendly — particularly for communities and parents ([↑Roy & Miah, 2018](#)) — as information can be difficult to locate and many web pages appear not to have been updated since 2016. Stakeholders have stated that the available education data is too descriptive, reducing the potential to strengthen the use of EMIS data in policy decision-making processes ([↑GPE, 2020b](#)). Findings from the same GPE report suggest that increased availability of data has not translated into improved data analysis, especially in relation to education quality and learning outcomes ([↑GPE, 2020b](#)). Challenges identified include a lack of capacity of actors (government staff, universities, and research organisations), financial constraints, and high staff turnover within ministries ([↑GPE, 2020b](#)).

5.4. Technology to promote school participation

The potential of EdTech to promote school participation has been thrown into sharp focus as a result of the Covid-19 pandemic, both in terms of promoting participation in online schooling and returning to schools once they reopen. This review identified eleven papers that discuss the potential of EdTech to

promote participation in schools. The themes that emerged are grouped around four areas:

1. Accessing remote learning during Covid-19
2. Technology to encourage school participation
3. Technology to assist in learning for visually impaired learners
4. Technology to reach crisis-affected areas.

It is worth noting that findings are disparate. With the exception of research on remote learning during Covid-19, the themes are mostly based on one or two studies or data from inter-connected studies. The reliability of the findings are, therefore, limited, and further studies are needed in the Bangladesh context to understand how technology can promote school participation outside of lockdowns and a global pandemic.

5.4.1. Accessing remote learning during Covid-19

Five papers identified for this review provide evidence on the use of technology to support access to education during the Covid-19 pandemic in Bangladesh. Faced with school closures, the government-run Sangsad TV channel began broadcasting daily lessons for learners in Grades 6–10 in March 2020 ([↑Beam et al., 2021](#)). These lessons were also available on a YouTube channel and the a2i platform, Konnect, which hosted the Sangsad TV lessons along with electronic textbooks, videos on life skills, and other educational materials ([↑Beam et al., 2021](#)).

Despite the availability of remote learning, not all children were able to continue their studies. A key challenge emphasised in the literature has been unequal access to technologies required to access remote learning ([↑Beam et al., 2021](#)). [↑Beam et al., \(2021: p. 5\)](#) found that just over half of households with learners enrolled in Grades 6–10 prior to school closures ($n = 7,576$) had access to an active data pack (53%), and two-thirds had access to cable TV (65%). Mixed-methods research with over 700 teachers, learners, and parents by [↑Das \(2020: p. 6\)](#) finds that urban learners are far more likely to access TV and smartphones than their rural peers: access was estimated at 70% for urban participants, and between 30–40% for rural participants.

Evidence shows that time spent studying decreased during the Covid-19 pandemic, and time spent on household chores increased ([↑Baird et al., 2020](#); [↑Beam et al., 2021](#); [↑Biswas et al., 2020](#); [↑Das, 2020](#); [↑Makino et al., 2021](#)). Gendered barriers underpinned these findings. [↑Baird et al., \(2020\)](#) find that girls are slightly more likely than boys to spend time on household chores and caring for others, although the authors note this was not statistically significant. [↑Makino et al., \(2021: p. 5\)](#) find that while time spent on household

chores and caring for others increased for both girls and boys, the “magnitudes of these changes were significantly larger for girls than for boys.”

Another reported reason for lack of time to study and engage with online learning was insufficient family support.↑[Biswas et al., \(2020\)](#) and↑[Das \(2020\)](#) point to the importance of family in supporting children to engage with online learning during school closures. A World Bank survey with over 2,000 Grade 9 learners (↑[Biswas et al., 2020](#)) connected this reduction in participation in education to a lack of instructional support from parents who, in their sample, had an average of five years’ education and felt unable to “engage their children academically, assess their progress and provide guidance” (↑[Biswas et al., 2020: p. 4](#)). The survey brought into sharp focus how household wealth was a determinant of the support children would receive for participating in online learning. Thirty-nine per cent of the learners from the bottom quartile reported receiving support from a family member compared to 62% in the top quartile (↑[Biswas et al., 2020](#)).

5.4.2. Technology to encourage school participation

One paper identified by this review suggests that EdTech in isolation may only have a modest effect on encouraging children to enrol in school. A recent experimental study conducted by ↑[Fujii et al. \(2021\)](#) on the effectiveness of conditional cash transfer programmes (CCTs) in deprived areas examined, among other objectives, whether sending information to parents through short message service (SMS) could increase secondary school learners’ enrolment rates. Overall, the research found that while SMS information increased secondary school children’s participation in school, the impact was modest compared to other aspects of CCTs.

However, one benefit of using technologies that are readily available relates to the issue of cost-effectiveness. ↑[Fujii et al. \(2021\)](#) concluded that the majority of households in their study location — Gaibandha, a relatively poor district in northern Bangladesh with 48% of the population living below the poverty line in 2016 — owned mobile phones, and so the cost of the SMS component of the CCT was relatively low compared to other aspects of the CCT. The authors conclude that SMS could, therefore, be “an important policy tool in places where resources for policy interventions are limited” ↑[Fujii et al. \(2021: p. 3\)](#).

5.4.3. Technology to assist in learning for visually impaired learners

Three papers uncovered through the literature search for this review centre on supporting children with visual impairments to participate in learning. These papers are all connected and include the same lead author, and are small-scale, design-based research studies with visually impaired learners

($n = \sim 9$ across the three papers), teachers of visually impaired learners ($n = \sim 18$ across the three papers), and experts in assistive technology ($n = \sim 6$ across the three papers)³⁰ ([↑Nahar et al., 2015](#); [↑Nahar et al., 2017](#); [↑Nahar et al., 2020](#)). The papers examine the potential of mobile technology to support visually impaired learners with maths and science learning. All three papers make promising conclusions about this potential. The mobile platform cited in ([↑Nahar et al., 2020](#)) contained math braille, voice feedback, vibrations to guide learners, and Bangla language instruction. The findings conclude that the teachers, learners, and experts ($n = 20$) who were involved in the research were satisfied with its ability to make maths and science more accessible for visually impaired learners in Bangladesh. The average score for the perceptions of participants for the usability of the mobile platform was four out of a possible five ([↑Nahar et al., 2020: p. 120](#)).

However, it is clear that these platforms are at early stages of development, and the studies are small-scale. It is not possible to draw widely applicable conclusions from the literature at this stage.

5.4.4. Technology to reach crisis-affected populations

Bangladesh has, in the last few years, seen an influx of more than one million Rohingya Muslims fleeing atrocities in neighbouring Myanmar. According to one estimate some 530,000 children aged 3–17 were in immediate need of education in emergencies, although secondary education is not available to them ([↑Karim et al., 2019](#)). However, this review identified limited rigorous empirical data or evaluation of EdTech for refugee children in Bangladesh. [↑Karim et al. \(2019\)](#) examined challenges and innovations for Rohingya refugee children in Bangladesh. While it was not the core focus of the paper, findings indicated that the significant majority of research participants ($n = 54$) expressed negative views surrounding the use of technology to provide education. The authors allude to the importance of community acceptance of EdTech, citing one response from a female participant who stressed the “demerits of top-down, non-interactive educational technologies” (p. 683).

The importance of community acceptance of EdTech is echoed in older research for UNICEF by [↑Morpeth et al. \(2009\)](#). Examining open and distance learning (ODL) for remote and crisis-affected areas in South Asia, with a focus on Bangladesh and Sri Lanka, the study emphasises the importance of the acceptability of such initiatives (including the Underprivileged Children’s Educational Programs) in Bangladesh. However, this finding was not a direct

³⁰ Please note it is not clear whether the samples across the three studies overlap or are duplicated, and therefore the sample sizes cited may be over-represented.

reference to the use of technology in this way, but rather to informal catch-up programmes.

5.5 Girls' education and technology

While there is broader evidence on girls' education in Bangladesh, this review identified relatively few empirical research papers examining girls' education and technology. Ten papers were identified: five academic and five which fell under grey literature.

The main themes that emerged from a review of the literature can be grouped into four key categories:

1. Girls' access to educational technology
2. Increasing equitable access to education
3. Girls' engagement with educational technology
4. The impact of EdTech projects on gender equality outcomes.

There are limitations to the literature identified. Generally, when girls are discussed, they tend to be grouped with women under the broader category of 'women and girls'. This overlooks the unique challenges girls face as a result of the intersection of their age (as children) and sex (as female). Additionally, broader studies exploring EdTech and education often do not disaggregate their findings by sex or age. When girls are mentioned, findings are mostly descriptive.

5.5.1 Girls' access to educational technology

Five papers address the common barriers to girls' access to educational technology. Barriers cited include poor internet connectivity, lack of access to technological devices, and limited digital literacy ([↑Billah, 2013](#); [↑Biswas et al., 2020](#); [↑Ferreira, 2017](#); [↑Ferreira et al., 2017](#); [↑Sarowardy & Halder, 2019](#)). None of the papers specifically explore the gendered barriers to access to educational technology, despite literature existing on the gender digital divide in Bangladesh (see, for example, [↑Tyers \(2012\)](#)). Findings within the literature are largely descriptive on this topic. For example, research by [↑Billah \(2013\)](#) only included female learners at Bangladesh Open University's programmes (including pre-tertiary programmes),³¹ and did not explore whether the barriers to EdTech were distinct for girls. While a survey conducted with over 2,000 Grade 9 learners and their parents by the World Bank during Covid-19 disaggregated findings by sex, and found that 19% of girls had access to the

³¹ BOU runs pre-university programmes, including at lower and upper secondary school levels. See, for example, [↑Alam & Rahman, \(2010\)](#) for more information.

internet compared to their male counterparts ([↑Biswas et al. \(2020: p. 3\)](#)), the gendered reasons behind this are not explored in any depth.

Three studies mention girls' access to mobile phones for the purposes of education. [↑Sarowardy & Halder \(2019\)](#) and [↑Biswas et al. \(2020\)](#) find that girls in their samples had sufficient access to mobile phones. But, conversely, an evaluation of the GIRLS Inspire programme revealed low rates of mobile phone ownership. The GIRLS Inspire programme provided ODL for women and girls in flood-prone areas of Bangladesh through solar-powered boat schools with access to internet-linked laptops, multimedia projectors and other educational resources. At the baseline, 24% of the sample ($n = 336$, see p. 4) reported owning a mobile phone ([↑Ferreira et al., 2017: p. 16](#)). Compared with higher rates of mobile phone ownership cited by [↑Sarowardy & Halder \(2019\)](#) and [↑Biswas et al. \(2020\)](#), this suggests that access to educational technology may be affected by living in marginalised or disaster-prone areas within Bangladesh.

5.5.2. Increasing girls' access to education through technology

Four papers discuss how educational technology initiatives have increased access to education for girls. According to [↑Billah \(2013\)](#), one of the benefits of e-learning and Open Educational Resources (OERs) is that they can enable girls and young women to study at any time, anywhere ([↑Billah, 2013](#)). Additionally, [↑Ferreira et al. \(2017\)](#) suggest that EdTech can be leveraged to overcome the barriers to education. Data from the final report on the GIRLS Inspire programme shows the extent to which women and girls were able to access training and learning in areas where they are typically held back: 13,578 women and girls across 64 villages participated in training. However, it should be noted that the study does not disaggregate its findings by age, and only around a quarter of the sample across Pakistan, India, and Bangladesh were under the age of 18; it is not, therefore, clear if or how EdTech distinctly benefits girls' education in Bangladesh.

In addition to directly affecting girls' enrolment, an experimental study by [↑Fujii et al. \(2021\)](#) shows how technology can indirectly benefit girls' access to education. Examining the use of 'SMS information nudges' to parents as part of conditional cash transfer programmes, the study found that SMS had a positive impact on the enrolment rates of girls in higher grades of secondary school in their sample. Additionally, the research suggests there are potential longer-term benefits for girls. The study found that girls who enrolled in school as a result of the intervention remained in school in the year following the intervention [↑Fujii et al. \(2021: p. 39\)](#).

5.5.3 Girls' engagement with educational technology in classrooms

Findings from an evaluation of BRAC-CAL in secondary schools ($n = 6$) in Bangladesh provides an insight into how girls engage with classroom-based educational technology ([↑Power et al., 2017](#)). Gender did not emerge strongly from the research, but was discussed across two of six participating schools. These discussions suggest that girls were less eager to operate CAL resources in front of the whole class than boys. There reasons were suggested by participants for this. Across both schools, participants thought that boys volunteered more keenly than girls, who appeared to be more reluctant. In one school, learners reported teachers favouring boys to operate CAL than girls. This was, however, contradicted by teachers in the second school who reported selecting boys and girls equally. No further evidence was identified by this review to elaborate further on this finding, and it should be explored further.

Two studies suggest that girls' ability to engage with learning facilitated by educational technology is affected by their teachers. Examining barriers to effective multimedia classrooms at City Girls' College in Jashore, [↑Sarowardy & Halder \(2019\)](#) finds that teachers struggled to adapt their traditional teaching practices, and their capabilities to engage with technology in this way were not matched to those of girls. This finding is corroborated by [↑Rahim's \(2017\)](#) case study on eight female teachers' perceptions of mobile-based technology for adolescent girls in Bangladesh. [↑Rahim \(2017\)](#) also argues that, in addition to teachers, there was also a lack of school administrators' support for curriculum change and using EdTech across schools.

5.5.4. Indirect impact of EdTech interventions on other gender indicators

Four papers on two programmes with a strong technology component, including digital learning ([↑Amin et al., 2016](#); [↑Amin et al., 2018](#)) shed light on how initiatives using EdTech projects' have affected other gender outcomes. The two programmes are GIRLS Inspire, described in Section 5.5.1. ([↑Ferreira, 2017](#); [↑Ferreira et al., 2017](#)) and Bangladesh Association for Life Skills, Income and Knowledge for Adolescents (BALIKA), a skills-building programme for rural adolescent girls in communities with high incidences of child marriage. The GIRLS Inspire programme was shown to increase economic empowerment for women and girls by enhancing their economic capabilities and skills (Ferreira et al., 2017), among other things. However, the authors emphasise that engaging the community and creating an enabling environment was also critical for allowing girls and women to pursue and access economic opportunities.

Findings from a large randomised control trial involving more than 9,000 girls aged 12–18 presented by Amin et al., ([↑2016](#); [↑2018](#)), shows how BALIKA significantly reduced child marriage. However, in noting study limitations, [↑Amin et al. \(2016\)](#) state that the link between the use of technology in relation to the reduction of child marriage was not explored. It is therefore not possible to assume causality, and the link should be further explored to understand or uncover such a link.

6. Summary of political economy analysis

This section presents an overview of factors underpinning the production of research and its use in policy and programme decision-making in Bangladesh. First, we summarised some of the recurring themes that appeared in literature exploring the political economy of research production and use. Second, we held interviews with 13 individuals across eight institutions to focus on issues more specifically related to the EdTech sector (see [Annex 3](#) for interview details). While the interviews frame the discussion in the context of the EdTech sector, they are also contextualised within a broader understanding of the education research ecosystem.

6.1. The production of research

Research exploring the role of EdTech in impacting access to or learning within education systems was a nascent area in Bangladesh prior to the Covid-19 pandemic. This has been the case despite EdTech being a strategic priority of the government, as well as a component of development partners' support to the education sector in Bangladesh.³² The following themes emerged as to why this is the case:

- EdTech is still an emerging area within the research sphere;
- There is low production of research within higher education institutes;
- International organisations have significant influence on research produced or on setting the policy agenda.

6.1.1. EdTech is still an emerging area within the research sphere

Regarding the production of EdTech research, the stakeholders who were interviewed for this review almost unanimously agreed that this was a new and emerging area. According to one stakeholder, pre-2017, primary and secondary education projects funded by the World Bank and the ADB had a component on EdTech integrated into programmatic design, however, research was not well integrated into these projects (*World Bank spokesperson*). This point was also made in relation to NGOs that incorporate EdTech into their intervention design. While many of these EdTech programmes have been introduced to target disadvantaged children, little research has been undertaken to evaluate what impact these interventions

³² As part of the Primary Education Development Programme III, for instance, while components of this project related to EdTech, there was nothing on the research side that evaluated the impact of these interventions on access and learning (*World Bank spokesperson*).

have had on access or learning (*University of Dhaka spokesperson*). Even during school closures because of the ongoing Covid-19 pandemic — when the use of EdTech increased to enable remote learning to take place — the evidence emerging on lessons learnt about the most effective application of technology for learning outcomes has lagged behind.

Stakeholders interviewed did acknowledge, however, that this was changing, and there was increasing understanding about which interventions are most effective. A new generation of donor-funded projects was, according to stakeholders we interviewed, beginning to approach EdTech interventions in a more rigorous manner. The feeling among those interviewed was that the Covid-19 pandemic had accelerated this trend (*development partner spokesperson*). Key players referenced as being active and visible in research during this period included donor partners and CSOs such as BRAC and CAMPE (*development partner and University of Dhaka spokespersons*). A marked shift during this period for World Bank-funded research, for instance, was a focus on EdTech research outside of the projects it was implementing.

6.1.2. The low production of research within higher education institutes

A historical overview of research products by higher education institutes in Bangladesh shows that while the number of research products coming out of universities has, over time, been increasing, a large number of public and private universities produce no research. In 2014, the UGC reported that half of all universities had not produced any research products whatsoever ([↑Rahman et al., 2019](#)). Private universities, in particular, are criticised for their low research output. However, current regulations mean that no private university is allowed to offer a PhD programme as part of the courses on offer ([↑Hossain & Hoque, n. d.](#)). Of the total academics in Bangladesh who are PhD holders, the overwhelming majority are concentrated in just a handful of established public universities: six³³ out of 33 public universities accounted for half of the total teaching staff in Bangladesh who hold a PhD degree ([↑Rahman et al., 2019](#)). Compared with other countries in Asia, Bangladesh fares better than Afghanistan, Bhutan, Sri Lanka, and Pakistan in terms of the numbers per million of the population who are enrolled in PhD programmes, but it lags behind India and Nepal ([↑Rahman et al., 2019](#)).

While universities offer courses in education and ICT (e.g., the IER at the University of Dhaka) or else offer remote teaching, there appears to be less research dedicated to EdTech within departments of education. Among the

³³ Dhaka University, Rajshahi University, Bangladesh Agricultural University (BAU), Bangladesh University of Engineering and Technology (BUET), Jahangirnagar University, and the Bangabandhu Sheikh Mujib Medical University

challenges faced by universities in producing research, many stakeholders interviewed identified funding as a major issue (*development partner and University of Dhaka spokespersons*). One academic mentioned that the budget available to undertake research within the institution he worked at was no more than USD 60 per month per academic (*University of Dhaka spokesperson*). The funding challenge is further amplified by the fact that private universities, despite making up the majority of universities in Bangladesh, receive no public funding (discussed in [Section 4](#)). Furthermore, the low amount of funding that public universities receive not only contributes to this challenge but also results in less time available for research as funding is often contingent on a high teaching component. A final challenge relating to funding is the skew in funding towards science, technology, engineering, and mathematics (STEM) subjects, which is often at the expense of non-STEM subjects (*development partner spokesperson*). This is supported by a World Bank study that observes that engineering and science not only produce the highest number of research outputs but also attract the greatest interest ([↑Rahman et al., 2019](#)).

Another issue mentioned in the interviews was the lack of motivation to prioritise research given its low importance in contributing to career development. Career progression, according to one stakeholder, is contingent on political connections rather than the number of academic journal articles that have been published, so the latter is de-prioritised. Moreover, funding for research can also be contingent on which political party an academic belongs to (*University of Dhaka spokesperson*). The absence of incentives in producing research in universities was something one stakeholder felt that senior government officials needed to address more forcefully (*development partner spokesperson*).

Literature sourced for this study indicated how a core part of the research infrastructure is missing. The communications revolution has not only presented an opportunity for researchers in Bangladesh to undertake more research, it has also significantly boosted the reach of Bangladesh's research itself ([↑Irfanullah, 2019](#)). However, access to up-to-date journals and publications within Bangladesh's universities is negatively affected by poor infrastructure, which hampers access to the internet. Just one-third of universities in Bangladesh are connected to high-speed internet ([↑Rahman et al., 2019](#)). Moreover, the lack of technical know-how on e-resource use against the backdrop of a low-productivity research environment also likely contributes to the poor utilisation of digital library services ([↑Rahman et al., 2019](#)).

The sentiment expressed by the stakeholders interviewed for this report found that while there is a challenge in universities producing research, the situation

is improving. As the demand for research increases, the role of private universities in producing research is becoming more visible, albeit from a low baseline (*development partner spokesperson*). Funding for private institutions has in recent years come through the HEQEP, which has tried to promote research production within universities (*development partner spokesperson*).

6.1.3. Influence of international organisations on research produced and policy agenda

In [Section 5](#) we considered one of the key findings to emerge from the literature sourced for this study — the number of studies focusing on EdTech as part of programmes introduced by international donor partners working in Bangladesh. As mentioned, the EiA programme, for example, made up approximately 10% of the total studies meeting the criteria for this review.

Not only do a large number of studies on EdTech focus on donor programmes, but, as reflected in the stakeholder interviews, the influence of international research on government education policy also appears to be much greater than research at a national level. One stakeholder stated this was due to government officials not having the capacity to interpret research at a national level in the same way as they were able to with international research. Moreover, research produced by international institutions is considered more credible for government decision-making processes (*development partner spokesperson*).

Another spokesperson attributed the dominance of international donors in setting the agenda to the reality of Bangladesh's dependence on external funding for its education programmes (*development partner spokesperson*). According to this stakeholder, the government is more responsive to research undertaken by particular development partners. The reason for this being the greater likelihood of this kind of research leading to change or its incorporation in individual donor policies and programmes. In turn, this often translates into additional financial assistance for the education sector to enable the rollout of such programmes.

6.2. The use of evidence in decision-making

Section 6.1 focused on the emergent themes coming out of the interviews relating to the production of research. However, our discussion also highlighted how some factors that are specific to Bangladesh might be used as evidence for decision-making. The following themes emerged:

- The shifts required to incorporate evidence into policymaking;

- The strength of CSOs in influencing policy, using an evidence-based approach;
- Institutional governance arrangements which influence policymaking processes;
- Strategies of success in incorporating research into policy.

6.2.1. The shifts in incorporating evidence into policymaking processes

In a study conducted by [↑Aminuzzaman \(2013\)](#), a questionnaire survey administered to civil servants found that the factors that are most influential in affecting policy formulation relate to technical assistance from external donors, together with the political will of the chief executive. Change in political leadership, on the other hand, had less of an impact on policy formulation compared to its influence on policy implementation.³⁴ Specifically, insofar as education is concerned, [↑Hossain et al. \(2019\)](#) find that, like other competitive clientelist states,³⁵ Bangladesh's political elite have been more reluctant to impose reforms relating to education quality that are known to work because this may be unpopular with their strategic bases of support. For instance, local government officials indicate that they often lack the authority to monitor reforms which are oriented towards improving teacher performance ([ibid.](#)).

Historically, the de-linkage between evidence and policymaking has also been connected to the weak quality of research produced at the national level. The absence of methodologically sound studies or the preponderance of studies focusing on small sample groups has made them less useful for policy formulation. Nonetheless, in recent years, the dialogue relating to research and policy has been changing.

The government has introduced a number of publicly accessible tools to monitor the state of the education system including the National Student Assessment, School Census and Annual Sector Performance Review. This is partly due to the increased political dominance of the Awami League which has been in power since 2009 and “has placed a strong emphasis on promoting development, in part to legitimize its project of securing political dominance” ([↑Hossain et al., 2019: p 66](#)).

³⁴ The study found that there were more factors influencing the implementation of policy as compared to its formulation.

³⁵ This means that whichever political party is in power, they are vulnerable to being displaced by their political competitors and are hence vulnerable to pressures from factions whom they rely on to keep them in power.

This shift in the demand for different sorts of evidence was discussed during the stakeholder interviews conducted for this study. As articulated by one stakeholder, over the last decade, there has been a greater emphasis by government officials in setting targets, both in relation to access and to learning (*development partner spokesperson*). Progress against these education targets has required more robust evidence systems, which include both data and research. More recently, the shift in focus from access-related issues to those which also prioritise learning has meant a recognition that reliance on data, as one form of evidence alone is insufficient. The results from the National Student Assessment, for instance, showed that a large proportion of children and adolescents were in school in Bangladesh but not learning basic literacy and numeracy skills (see [Section 2](#)). The greater complexity surrounding issues relating to quality and learning has meant that administrative data alone has been insufficient in providing solutions. As such, this has triggered growing demand for research evidence within government circles (*development partner spokesperson*).

6.2.2. The strength of civil society organisations in influencing policy using an evidence-based approach

Bangladesh is a country with vibrant CSOs and with some of the best-known NGOs, such as BRAC, originating there ([↑Lewis, 2015](#)). As discussed in [Section 4.1.3](#), these CSOs often have considerable weight. [↑Pellini et al. \(2021\)](#) consider this not only in the context of producers and users of evidence, but also in terms of what are referred to as “evidence intermediaries”, which would also apply to CSOs.

Studies looking at the historical role played by CSOs find that elected officials have tended to resist policy advice coming from outside their core policy network ([↑Rashid, 2013](#)). During the period in the 1990s, when the political landscape tended to be dominated by military regimes, CSOs saw a decline in their effectiveness ([↑Sobhan, 2002](#)). More recently, under the political dominance of the Awami League who have been in power since 2009, some studies appear to indicate that the CSO space is narrowing. Following on from their electoral success in 2014 — when the Awami League won a consecutive second term — CSOs indicated that the government had become less tolerant of dissent with a shrinking space available for critical groups and voices. What was once a diverse space has transitioned to one made up of fewer key players ([↑Lewis, 2015](#)).

The background to these intermediary actors is useful given the importance afforded to CAMPE and BRAC by several stakeholders interviewed for this study. One academic, for instance, pointed out how it was CSOs rather than universities that tended to have the institutional power to leverage and affect

government policy through their research (*University of Dhaka spokesperson*). Part of this relates to the political connections that CSOs have, which reflects the point made in the paragraph above. For instance, CAMPE is currently run by Rasheda Choudhury, who was part of the interim caretaker government in 2008, before the Awami League came to power in 2009. While in position as Advisor to the Minister, Rasheda was involved in the government's decision-making processes. This afforded CAMPE not only greater knowledge of the operations of government systems, but also access to and influence with some of the key decision-makers in government. When conducting round-table discussions with stakeholders, CAMPE's strategy is to make sure they include representatives from opposition political parties so as not to appear partisan and in order to remain connected to all political parties (*CAMPE spokesperson*).

An example of this influence relates to the Education Watch report, which is produced annually by CAMPE, and which was referenced as extremely influential to the government's policy agenda (*development partner spokesperson*). In 2009, CAMPE made 40 recommendations to the National Education Policy Formulation Committee under the Education Watch banner. All of these recommendations were subsequently reflected in the National Education Policy in 2010 ([↑Hoque, 2015](#)). The spokesperson for CAMPE who was interviewed for this study corroborated its clout in several other ways. The first of these was how media institutions in Bangladesh often call on CAMPE for updates on what is happening in the education sector, which, as the spokesperson put it, increases pressure on the government to engage with CAMPE. Second, the CEO of CAMPE currently acts as an adviser to the MoE, meaning that CAMPE's position is often reflected in government decisions. Lastly, even where ministers cannot acknowledge findings from the Education Watch report, the issues are acknowledged behind the scenes (*CAMPE spokesperson*).

Elsewhere, the influence of BRAC's research on government policy was similarly acknowledged by several stakeholders. One example during Covid-19 related to a BRAC study, which documented how, during the school closures, educational access for the most marginalised groups was adversely impacted due to their poor access to low-tech devices. This study fed directly into government discussions looking at how to integrate solutions concerning virtual learning that would give access to the most marginalised (*Government spokesperson*).³⁶ The importance of BRAC's research in influencing policy is in part due to the comparative advantage it has over other researchers. Its own

³⁶ However, while successes about incorporating CSO recommendations into policy are reported, when it comes to implementing these recommendations, the picture appears less positive (*CAMPE spokesperson*).

working model in the field has allowed for BRAC research to focus on scalable interventions, which was found to be more amenable for government officials to confidently incorporate into policy, compared to studies where the sample size is small. Another factor explaining BRAC's relative success is that their research products are often in demand by government officials (*development partner spokesperson*).³⁷ This latter point speaks to some of the wider strategies discussed in Section 6.2.4.

The success of CSOs in influencing policy was in contrast to the reach universities had through the research they produced. While research production from academia was considered low (see [Section 6.1.2](#)), where it did occur it was deemed insular and disconnected from policy, produced for academics alone, and not necessarily aligned to government priorities. Moreover, the objectives of academic institutions did not appear to prioritise positioning their research to help inform government policies. This is one aspect that sets it apart from research produced by CSOs. Another reason for the difference between the two groups was the absence of academics from structures through which researchers may potentially reach policymakers. The membership of the ELCG, for instance, is currently an apparatus that CSOs use to interact with government officials and to present their own research to key players who are important in decision-making processes. However, there is currently no academic representation in this group (*CAMPE and development partner spokesperson*).

6.2.3. Institutional governance arrangements that influence policymaking processes

One past study looking at Bangladesh's policy ecosystem found that the frequent changes in senior policy positions within ministries had led to a loss in institutional memory, continuity, and thrust in policy ([Aminuzzaman, 2013](#)). This was supported by various stakeholders who were interviewed for this report. Stakeholders problematised the relatively short duration civil servants remained in one continuous post by indicating how this weakened the efficacy of turning evidence into policy (*British Council spokesperson; University of Dhaka spokesperson*). This high turnover is also true of political positions. However, the longevity of Dipu Moni (Minister of Education since January 2019 and still in post) has received a cautious welcome from

³⁷ While there was a near-absence of any discussion on universities and their influence on policy, one stakeholder did mention the IER at Dhaka University. As a state-led university, IER is under government leadership and hence it is always close to the government's opinion or agenda (*CAMPE spokesperson*).

stakeholders who see it as a positive sign for consolidating priorities within the education sector (*CAMPE spokesperson*).

Aside from length of stay, the issue of policy formulation was discussed by stakeholders as being problematic due to the low number of education sector civil servants possessing an education-specific background (*British Council and University of Dhaka spokespersons*). Often, senior decision-makers joining the MoE come from the administrative cadre, which not only affects consistency in policy but also means that ad-hoc decisions are more likely (*CAMPE spokesperson*).

Another problem contributing to the disconnect between research and practice was what one stakeholder termed the “illiteracy” of policymakers in easily translating existing research into policy. While this is a capacity issue, it is a problem compounded by the disconnect, particularly of academic research within policy circles, with this type of research being seen as too theoretical for policy purposes (*development partner spokesperson*). A GPE-commissioned report supports these findings, specifically in relation to discussions around the capacity issues relating to the use of EMIS. The findings suggest that not only is the available education data descriptive in nature (which limits its usefulness for policy debate), it is also poorly incorporated into policy decisions due to lack of demand. This has resulted in the limited capacity of government officials for using EMIS ([↑GPE, 2020b](#)). One official we interviewed indicated that this problem of capacity was prevalent among government officials working in the DPE. The problem is a failure to provide proper guidance about what personnel working in the EMIS section should develop in terms of data outputs. The consequence is that EMIS data often fails to move beyond descriptive statistics (*development partner spokesperson*). The same official indicated that policymakers require sensitisation around the use of EMIS in decision-making processes, with an emphasis on capacity building.

The focus on EdTech in the interviews meant that when discussing issues to do with capacity, a number of respondents made a clear distinction between the MoE and MoPME versus a2i. a2i is strategically important given its link to the Prime Minister’s office, together with the support it receives from international funders such as UNICEF. It is staffed with comparatively younger personnel when compared to other ministries from whom it can “poach” talented staff (*University of Dhaka spokesperson*). It is also more evidence-led compared to the MoE, meaning that its approach is often dictated by looking for innovative, evidence-based solutions which have worked (*University of Dhaka spokesperson*). The MoE and MoPME, however, are responsible for drafting education policy, and these institutions lag behind when it comes to incorporating innovative solutions to teaching and learning (*CAMPE*

spokesperson). Policymaking is therefore a “perception-based” process rather than an evidence-based process (*development partner spokesperson*).

6.2.4. Strategies of success in incorporating research into policy

During the interviews held with various stakeholders, discussion turned to enablers of long-term political buy-in for research by government partners.

The first factor involved ensuring that any research they conducted was not “adversarial” when it came to reporting on government policy. The CAMPE spokesperson compared their more collaborative approach to working with governments to that of other CSOs. Transparency International’s approach, for instance, has been described as “combative” and always acting as a voice of opposition to government policy in its reports. CAMPE, on the other hand, has not necessarily always tried to position itself in opposition to the government, which is one of the factors it attributes to its success (*CAMPE spokesperson*). A related point discussed by a development partner spokesperson was that research focusing on programmes that have had little positive impact on educational access and quality have tended to be less in demand. Conversely, this type of research has been more likely to be desired by development partners as they seek to understand which interventions are the most cost-effective (*development partner spokesperson*).

On the other hand, the government has shown itself to be more interested in areas of research where Bangladesh has outperformed other countries, or has made progress but can still make more. One example was discussed in an interview related to access. While participation rates have improved, some of the most marginalised groups are still being left behind. Reaching these groups aligns with the Ministry’s areas of interest, specifically in pinpointing the solutions that might help to achieve better progress (*development partner spokesperson*).

The second strategy regards aligning research to government priority areas in their national strategy. Where the topic of research falls outside of government priority areas, research has less buy-in, visibility, or influence to inform policy. However, aligning research is not always sufficient for it to be utilised. Involving government officials early on in the process was also identified as an essential factor. One spokesperson emphasised the need for a sort of “check-in” with responsible ministry directorates before the research starts. All too often, this step of involvement and advance warning is overlooked by researchers who underestimate the importance of signaling the type of research being planned. This can take government officials by surprise and lead to a lack of political buy-in (*development partner spokesperson*). This was confirmed in another interview, where we discussed how buy-in and

engagement with government stakeholders are crucial for research to be heard and incorporated into decision-making processes (*British Council spokesperson*).

7. Emerging priorities and opportunities for collaboration

This review has identified a number of emerging priorities, opportunities, and challenges that should be further explored through collaborative research. Based on what is known about Bangladesh's education system more generally, this section considers some of the emerging priorities to take forward for future research in the context of EdTech. These are discussed according to the five areas on which EdTech Hub focuses.

7.1. Technology to support personalised learning and teaching at the level of the learner

Personalised learning is an area where there is significant emerging technical interest and financial investment from the education community. Currently, however, there is a lack of rigorous evidence on how technology can be used most effectively to personalise learning to the right level, in a cost-effective and contextually appropriate way in Bangladesh. Some of the gaps worthy of exploration regarding this theme in Bangladesh are set out below.

7.1.1. Technology to adapt to the needs of the most marginalised learners

The paucity of research in examining the role of technology-enabled training to help enhance the differentiated needs of learners is one potential area of research for Bangladesh. In most contexts, traditional teacher training practices have not properly taken into account the specific needs of different groups of learners. A better understanding of what enables these groups to participate and learn more effectively in the classroom is needed ([UNESCO 2020](#)). This is especially true for the most marginalised learners, many of whom are the first generation to access schooling.

7.1.2. Technology-assisted personalised learning approaches to help improve learning outcomes

While Bangladesh has made progress in education access indicators, its system is beset with challenges when it comes to the quality of learning. This is expected to worsen due to the impact of the Covid-19 pandemic. Currently, a large research gap relates to whether (and if so, how) personalised approaches that feature technology adaptation or devices that allow for adjusting to learner needs can lead to better learning outcomes. Related technical, classroom, and system factors also need to be explored.

7.2. (In-service) teacher professional development, structured pedagogy, and technology

As part of the new curriculum, which the Government of Bangladesh plans to roll out in 2022, an important part of TPD will include enhancing teachers' knowledge and skills around the use of EdTech.³⁸ Its importance has been elevated due to the roll-out of online and remote learning during the Covid-19 pandemic, and the ability of all teachers to adapt to new learning approaches. While the TPD theme contained the largest number of studies found for this review, we nonetheless identified a number of gaps. A general observation is that, of the studies sourced for this review, few studies detailed the cost-effectiveness of specific interventions. Some of the specific areas which may be worth considering for future TPD research in Bangladesh are as follows.

7.2.1. EdTech and TPD for pre-service teacher trainees

Of the literature reviewed for this study, few studies on TPD focus on the level of pre-service teacher training. The skew towards the research on in-service teachers implies that there is much more to research on how technology can enhance the development of pre-service teachers. For instance, understanding how more innovative and inclusive approaches through the use of technology can help prepare teachers to manage diverse classrooms is a current gap.

7.2.2. EdTech, TPD, and teacher voices

Another gap relates to the near absence of studies on TPD that incorporate teacher needs. Undertaking needs assessments with teachers is vital in ensuring that initiatives are designed to address what teachers themselves require for their own professional development. This is particularly important for EdTech considerations, especially considering the variation in technology use and attitudes among teachers in Bangladesh, in addition to the finding that teachers engaged in tech-supported TPD off-site.

7.2.3. EdTech, TPD, and distance education

Aside from the studies on the EiA programme, this review found limited research that explored the use of technology to facilitate TPD via distance learning for teachers. Distance learning programmes have featured as one of the main activities needed to enhance TPD in the government's Master Plan

³⁸ Email correspondence with the Government of Bangladesh.

for ICT ([↑MoE, 2013](#)).³⁹ This provides an opportunity to more strongly align future research on TPD with what has already been identified by government priorities.

7.2.4. The role of EdTech in helping TPD to more effectively reach the most disadvantaged groups

A further gap identified in the literature on EdTech in the context of TPD is research focusing specifically on marginalised learners. The needs of these learners are often diverse and complex, requiring specific pedagogical techniques to enable effective learning. Not only were differences between learner and teacher groups rarely addressed, but studies also failed to distinguish what impact particular interventions had on different groups of learners.

7.3. Technology to advance data-use and decision-making in education

An area where EdTech Hub has a significant opportunity for further exploration in Bangladesh relates to the system-wide use of technology, both in improving data systems that facilitate management processes, and in informing policymaking. The near absence of research on EdTech and data-use and decision-making makes it difficult to know what specific areas require investigation or which gaps exist in practice. The research reviewed, together with the stakeholder interviews, have demonstrated the importance of data to inform policymaking and the integration of technology in data processes. This further highlights the need for research in this area.

7.3.1. EdTech and data on learning determinants

Given that in Bangladesh, education outcomes on learning currently lag far behind the progress made on access over the last 20 years, a starting point could be a focus on the determinants of learning. Understanding what role, if any, technology has had in collecting and disseminating data on the determinants of learning would be valuable given its current absence. This is especially pertinent given the increasing government focus on the availability of data in recent years. A related point to this discussed in [Section 6](#) concerns the reported difference between the increased availability of data versus the low capacity within the system to analyse this data ([↑GPE, 2020b](#)).

³⁹ A recent review, however, concluded that these programmes have not yet been implemented, and that online teacher training courses are not easily accessible ([↑MoE, 2019](#)).

7.4. Technology to promote access and participation in school

Prior to the Covid-19 pandemic, a 2016 / 17 survey suggested that approximately three million learners aged between 6 and 14 remained out of school ([↑Results for Development, 2020](#)). The World Bank has simulated that the impact of Covid-19 will increase the numbers of children and adolescents who are out of school — especially from the most marginalised groups. Anticipating this trend, the Government of Bangladesh has begun to think about its policies post Covid-19, and the role of EdTech in ensuring participation through blended learning approaches to delivering education.⁴⁰

7.4.1. EdTech, participation, and the marginalised

In the aftermath of Covid-19, the role of educational technology in promoting access to, and participation in, school or alternative educational opportunities, will be important. This is especially true for marginalised learners who will have lost access to schooling, and who are less likely to return to school after an interruption to their schooling. While access to EdTech offers an alternative means of continued engagement with learning, evidence suggests that the most marginalised groups have less access to EdTech than their more advantaged counterparts. Few studies in this review were found to focus specifically on SEND and conflict-affected children. More research is needed on the role of EdTech in encouraging enrolment for marginalised children — either through direct enrolment in schools or through online courses.

7.5. Girls' education and technology

Of the literature reviewed for this study, a notable limitation contained within the research design was the poor disaggregation between women and school-aged girls. Given the different challenges facing these groups, a specific focus on technology that relates to girls of primary or secondary age is important for any future direction of study concerning research on girls and technology. Specific research areas where research gaps appear to exist, and which would be relevant for Bangladesh are as follows.

7.5.1. The role of technology in enhancing learning outcomes for girls

None of the studies reviewed for this study focused on what effect, and under what circumstances, the roll-out of technology can impact girls' learning

⁴⁰ Email correspondence with the Government of Bangladesh.

outcomes. This review found that most of the studies evaluated what effect programmes — of which EdTech was one component — had on girls' education. Few, however, isolated what specific impact EdTech interventions alone had on girls' access and learning outcomes and this is an area for further exploration.

This review has identified a number of emerging priorities, opportunities, and challenges that could be further explored through collaborative and critical EdTech research. Drawing on the existing EdTech evidence base in Bangladesh, there appears to be potential for technology to play an important role in education reform in the country. However, there also remains significant potential to investigate other avenues. The priorities identified will serve more broadly to foster and sustain a conversation with a community of practice and learning among education stakeholders about the use of EdTech in Bangladesh.

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Annex 1: Search terms used for review

Focus area	Search terms
Bangladesh	"Bangladesh"
Education	"Education" OR "Learning" OR "Teaching" OR "School"
Technology	"EdTech" OR "Technology" OR "Digital" OR "Device" "Phone" OR "ICT" OR "Computer" OR "Radio" OR "Television" OR "Laptop" OR "Tablet" OR "TV" "Remote learning" OR "Distance learning" OR "Online learning" OR "Mobile learning" OR "Blended learning" OR "Virtual learning" OR "Elearning"
Targeted focus (to primarily be added to first search string above)	"Girls" OR "Gender" OR "Gender divide" "Refugees" OR "Rohingya" OR "Forced displacement" OR "Conflict" OR "Emergency" "Personalised" OR "Personalized" OR "Personalised learning" OR "Personalized learning" OR "Personalised adaptive learning" OR "Personalized adaptive learning" "Learner management system" OR LMS OR "Education Systems" OR "Data management" OR "Planning" OR "Accountability"

Annex 2: Mapping the studies to five focus themes

Note: Numbers in sub-themes may equal more than the total number of papers identified for that theme, as a paper may appear under more than one sub-theme.

EdTech theme and sub-theme	Frequency
Personalised learning	5
Learner-centred learning	5
English language learning	3
Teacher Professional Development	37
Technology to improve access to TPD	10
TPD approaches and blended approaches	13
Technology for content sharing and creation	3
Technology to foster support and communities of practice	15
Teachers' attitudes, adoption and use of technology ⁴¹	10
Barriers in utilising technology to support TPD	4
Data	1
Data collection	1
Access and participation	10

⁴¹ Three additional papers explored teacher educators' attitudes, adoption, and use of technology.

EdTech Hub

Accessing remote learning during Covid-19	5
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Technology to access school participation	1
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Technology to assist in learning for visually impaired learners	3
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Technology to reach 'hard-to-reach' areas	2
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Girls' education	10
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Girls' access to educational technology	5
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Increasing girls' access to education through technology	4
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Girls' engagement with educational technology in classrooms	2
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Indirect impact of EdTech interventions on other gender indicators	4
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Annex 3: Interviews

Position	Organisation	Date interviewed
Deputy Director	CAMPE	22 March 2021
Programme Manager, Education	BRAC NGO	24 March 2021
Senior Economist	World Bank	24 March 2021
Policy Expert (Education)	a2i	25 March 2021
Associate Professor	University of Dhaka	20 April 2021
Education Specialist	UNICEF	21 April 2021
Research Fellow	BRAC University	22 April 2021
Research Associate		
Head of Education	British Council (Bangladesh)	28 April 2021
Regional Education & English Academic Lead		
Director of Education		
Project Manager, Education Development		