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Girls' Education and EdTech: A Rapid Evidence Review

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Notes

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Rapid Evidence Reviews

This publication is one part of a series of Rapid Evidence Reviews that has been produced by EdTech Hub. The purpose of the Rapid Evidence Reviews is to provide education decision-makers with accessible, evidence-based summaries of good practice in specific areas of EdTech. They are focused on topics which are particularly relevant in the context of widespread global challenges to formal schooling as a result of COVID-19. All the Rapid Evidence Reviews are available at https://edtechhub.org/research/.

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Abbreviations and acronyms

EdTech	Educational Technology
ICT	Information and Communications Technology
LMIC	Low- and middle-income country
ODL	Online and Distance Learning
RER	Rapid Evidence Review

Summary

This Rapid Evidence Review (RER) provides an overview of the existing literature on the use of technology in supporting girls' education in low and middle-income countries (LMICs). The RER has been produced in response to the novel 2019 coronavirus (COVID-19), and the resulting widespread global shutdown of schools. It therefore has an emphasis on transferable insights that may be applicable to educational responses resulting from the limitations to the continuation of schooling caused by COVID-19. Established approaches to maintaining continuity of education for the most marginalised have particular salience during this period because of the significant increase in the number of students at risk of disruption. Research consistently shows that while education across the board is negatively affected by crisis situations, the schooling of girls is disproportionately impacted. The RER aims neither to advocate nor discourage the use of technology in girls' education in response to the present COVID-19 pandemic, but rather to provide an accessible summary of existing evidence on the topic so that educators, policy makers and donors might make informed decisions about the potential role of technology in delivering education for girls.

The RER involved a systematic search for literature about the use of technology in girls' education from academic journals within education, social science and humanities disciplines. As further detailed in the methodology section, the papers referenced within this RER are primarily written in the last 20 years and focus on the technology-enabled education of girls in LMICs. Details on the inclusion criteria, as well as the associated limitations, are explained in the methodology section. The rapid nature of the review required a focused approach to literature discovery and a thematically guided process of analysis so that a timely response to COVID-19 might be provided. The search strategy was not therefore designed to be exhaustive.

The findings of the thematic analysis of the relevant literature on technology in girls' education are structured according to three themes:

1. **Girls' engagement with technology in education**. This theme explores the potential for technology to promote educational equality with a focus on girls in LMICs.
2. **Equity of access to technology.** This theme discusses the barriers that girls face in achieving equitable access to educational technologies.

3. **System readiness.** This theme focuses on the broader preparedness of systems and infrastructure in LMICs to use technology to facilitate girls' education.

There are four key findings based on the analysis of the literature.

1. Access to technology has been shown to be often disproportionately more empowering for girls relative to boys, with wider benefits which expand beyond formal education.
2. Most studies suggest there is a significant existing gender digital divide: cultural bias and gendered assumptions about girls' competence and enjoyment of technology, and the benefits and risks they accrue from using it, mean that girls are afforded less access to technology, both inside and outside the classroom.
3. Parents and teachers are key gatekeepers to girls' access to technology. Unless parents and teachers are involved in programme development and receive adequate and ongoing training in technology usage and gender-responsive teaching, there is concern that increased use of technology may only increase the gender digital divide.
4. Exploring a broader range of technology options — particularly mobile phones — may provide opportunities to overcome persistent gender barriers and infrastructural challenges and facilitate more inclusive and empowering learning opportunities for girls.

Within the context of COVID-19 forcing global educational changes, these findings suggest ways in which technology can facilitate increasingly equitable access to education for girls in LMICs.

1. Introduction

The COVID-19 pandemic has led to greater reliance on distance learning methods for students and teachers. Physical distancing policies to suppress the spread of the novel coronavirus often advise that students and teachers cannot congregate in schools in the conventional manner. Digital technology (information and communications technology) has the potential to play an important role in tackling the educational challenges raised by COVID-19 by delivering education over distance and at scale.

1.1. Purpose

This RER provides an overview of how technology has been used in LMICs within girls' education at primary and secondary levels prior to the current pandemic. It does this to offer evidence into how technology can be of potential benefit to girls' education and explores the current barriers preventing equal access to technology. It contributes to the emerging knowledge base and organises the most relevant literature into coherent themes for the consideration of key stakeholders in how to employ technology to benefit girls' education.

The current health crisis has led to increased global attention on the use of technology within education. This presents an opportunity to explore alternative means of girls accessing education, which is particularly important in LMIC contexts where girls have typically been less likely to access conventional education, particularly those disadvantaged due to poverty, location and disability, for example. This RER presents the potential benefits of technology for girls in education in LMICs but also highlights the risks of implementing technology within education without fully considering the gender digital divide.

1.2. Application

The insights presented in this RER are expected to be viewed as principles for the planning and implementation process for technology within girls' education. The implications for designing and implementing specific strategies are likely to vary according to the local context, and so the principles should be adopted and adapted accordingly. Patterns of good practice have emerged from the evidence on how, when and why technology can and should be used in educating girls, and it can be reasonably expected that many of the insights are applicable in the COVID-19 context.

1.3. Research questions

Two research questions guide the study:

1. What are themes in the use of technology in girls' education in LMICs that relate to the specific challenges of the COVID-19 education crisis?
2. How do major disruptions to education such as COVID-19 affect girls' use of EdTech?

1.4. Structure of the RER

The next section explains the methodology of the RER. This is followed by the presentation of the findings of the systematic literature review and thematic analysis. The final sections provide a synthesis of both the literature review and thematic analysis findings, as well as a series of recommendations on how technology in girls' education might best be employed.

2. Methodology

The methodological approach is informed by the Cochrane Collaboration Rapid Reviews Methods Group interim guidance on producing rapid reviews (Garrity et al., 2020). This permits a rigorous and systematic approach, while defining the scope narrowly enough that it can be completed within a short span of time. Unlike other rapid evidence assessments, such as Education Endowment Foundation's meta-analysis of other systematic reviews on distance learning, this RER is modelled on a systematic thematic review of primary studies.[1] After defining the research question and eligibility criteria, a brief scoping review was conducted to help elicit relevant search terms for the search queries. Details of both the search-term scoping review, as well as the eligibility criteria for the discovered literature, are detailed in the following sections.

2.1. Scoping review

Unlike systematic reviews, the criteria for scoping reviews are not yet well-defined. However, these reviews are widely considered as representing a stage prior to a systematic review where the key concepts and ideas that define a field are explored and discovered in an iterative process (Daudt et al., 2013; Levac et al., 2010). Notably, the scoping review of this study did not aim to map out all the concepts, theoretical and otherwise, included in the scope of technology and girls' education. Instead, it had a more pointed focus: to identify keywords and terms that had been used in studies that discuss the use of technology for girls' education. The scoping review process began by noting relevant keywords and terms that were already known to the authors to search for additional literature. The process was iterative, with the terms found in one article leading to searches for other articles that then revealed different, or the same, terms. Using this method, a list of 20 search terms was compiled (Annex A). It is important here to draw attention to the point that when a search term brought up an article with a relevant title, those articles were saved to be screened later alongside those that were found during the main literature search explained below.

[1] Higgins and Green (2011) distinguish a systematic review thus: "*A systematic review is secondary research that seeks to collate all primary studies that fit prespecified eligibility criteria in order to address a specific research question, aiming to minimise bias by using and documenting explicit, systematic methods.*"

2.2. Literature search and eligibility criteria

The literature search began after establishing the search terms at the end of the scoping review. Google Scholar constituted our primary source of literature. Figure 1 below details the process used to arrive at the articles that were ultimately thematically analysed in this review. It is important to highlight that unlike a more traditional systematic review process, which may screen all search results, the rapid review methodology used herein relied on a system of quotas. As such, only the most relevant results (up to a maximum of 700 results), as ranked by Google Scholar, were selected for the first round of screening. Twenty different search strings were run, returning over 50,000 results. Of these, 90 articles were initially captured for further screening.

The title and abstract screening, as well as all other subsequent screenings, were conducted according to the eligibility criteria laid out in Table 1. It should be emphasised though that the screening criteria were not absolute. For example, when search terms returned a large number of studies, the date parameters were re-adjusted to return only literature from 2008 onwards. Moreover, while the majority of selected literature met the eligibility criteria, a small, complementary collection of literature that was deemed especially informative, but did not meet all criteria, was retained. However, these exceptions were only made when an article met all except one of the eligibility criteria. An exception, for example, might be made if a study explored the gendered aspects or use of EdTech, but focused on tertiary or higher education contexts in LMICs.

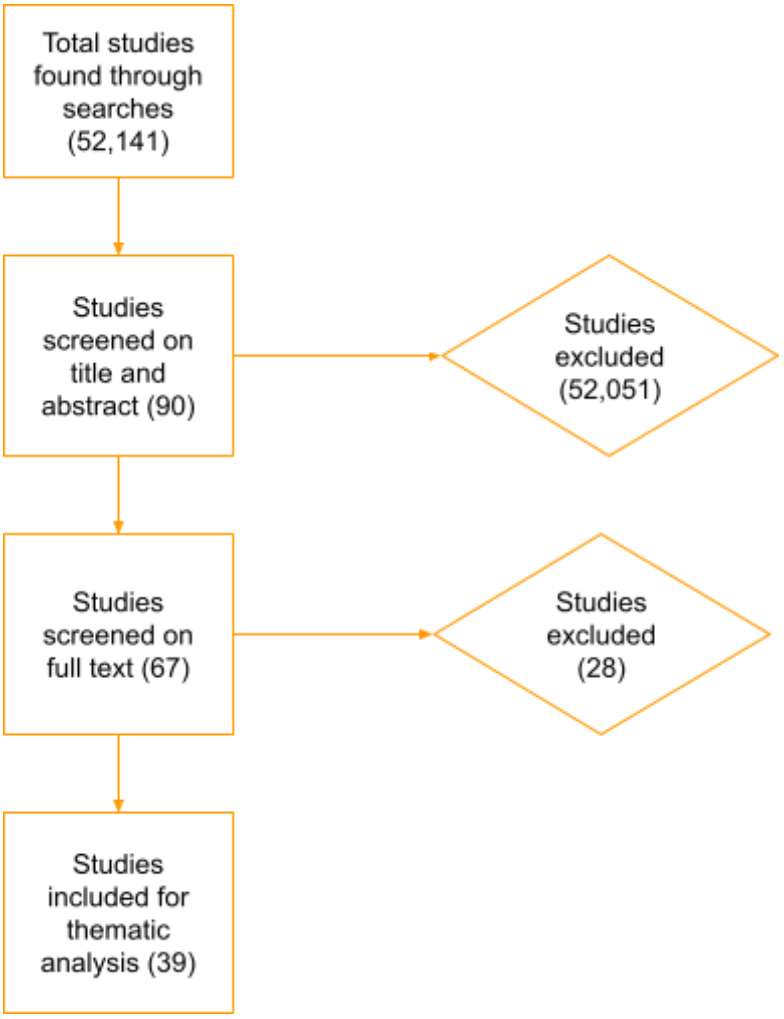
One limitation of relying on Google Scholar as the primary source of literature was the number of low-quality — and often non-peer-reviewed — papers in the initial screening. While the title and abstract may have demonstrated the necessary relevance for inclusion, the substantive content often turned out to be of low quality. These were only filtered out only after a full reading of the text.

A decision also had to be made about whether to include literature on girls' participation in IT classes in LMICs. There was, for example, a distinct literature exploring girls' lack of participation in IT or STEM subjects in these countries. However, it was decided that this literature, while providing some useful contextual background, addressed issues that were substantively different from those exploring the use of technology in facilitating girls' education.

***Table 1**. Eligibility criteria for literature searches and screening.*

Criterion type	Inclusion criteria
Education	Primary and / or secondary
Geography	LMICs
Literature type	All
Date	2000–2020

***Figure 1.** Literature search and screening process.*



2.3. Theme identification

The search and screening process identified 39 papers for analysis. The thematic analysis of these papers led to them being classified into three themes. Those themes and their sub-themes, which are discussed in depth in the findings section, are as follows:

- Girls' engagement with EdTech
  - Girls' use of technology
  - Gendered benefits
  - Range of benefits
  - Risk of widening the gender divide
- Equity of access
  - Attitudinal bias
  - Unequal access to technology within schools
  - Unequal access to technology outside of school
  - Self-regulation
- System readiness
  - Teacher training
  - Educational systems
  - Policy and government buy-in

3. Findings

Upon completion of the literature search and subsequent screening processes, 39 papers were found and thematically analysed. The groupings that emerged from that analysis were: girls' engagement with technology; equity of access; and system readiness. These are discussed in the following sections.

3.1. Girls' engagement with EdTech

Inequality in access to EdTech for girls is well documented. Where girls do get access, many studies offer an optimistic view that this access to technology can improve girls' education by expanding and enhancing learning opportunities. This section explores the potential for technology to promote educational equality for girls in LMICs. The following themes emerged from the literature and are discussed in turn.

- Girls' use of technology: When barriers are removed and female students are given access to technology and technology-enabled education, studies have shown that girls are likely to respond with a high level of engagement.
- Gendered benefits: Furthermore, a number of studies agree that access to technology has been shown to be disproportionately more empowering for girls and women than for boys and men.
- Range of benefits: The advantages for girls expand beyond the realm of formal education and empower them in other areas of life.
- Risk of widening the gender divide: If the gender dynamics are not considered, the use of EdTech carries the risk of heightening gender disparity within education in LMICs.

3.1.1. Girls' use of technology

Several studies indicate that female students are likely to have a higher level of engagement than male students when provided with equivalent access to technology. As noted in a study with particular relevance to COVID-19 due to the flexible modes of learning it discusses, Zelezny-Green (2018) engaged school girls in Kenya with two educational apps on their mobile phones for after-school learning. The majority of participants within the study were found to use their mobile phone in ways that "*enhanced their life choices*" and promoted both formal and informal learning. This was the case despite obstacles discouraging phone use such as phone bans within school grounds and limited financial resources for charging and topping up their phones.

Among women and girls who have access to the Worldreader app,[2] significantly greater use of the resource has been recorded among female readers compared to male readers (West & Chew, as cited in Dahya, 2016).

3.1.2. Gendered benefits for girls in accessing technology

Several studies have found that women and girls who are given access to technology benefit from their use to a greater extent than their male counterparts. For example, Khan and Ghadially (2010: p. 670) conclude that "*technology holds empowerment potential for disempowered groups generally, and an equalisation potential for women particularly*". This finding was based on a gender analysis of Muslim youth in India, where Khan and Ghadially (2010: p. 665) found that "*there was a consistent gender difference — in all cases women experienced more empowerment than men*". Furthermore, their study found that women continued to benefit disproportionately from access to technology even in situations where both genders had equal access.

Access to education through technology has also been found to enable women to independently educate themselves further. In an early literature review of mobile-learning and gender across Africa, Zelezny-Green (2011) noted a substantial bonus to mobile-assisted literacy learning for women and girls, giving them access and understanding of online content in languages that they may not have previously been literate in.

3.1.3 Wide range of benefits for women

The benefits of technology to girls and women stretch beyond the realm of formal education. Empowerment as understood holistically by Khan and Ghadially (2010), includes psychological, social, educational and economic advantages for women.

Ferreira (2017: p. 41) identifies through the GIRLS Inspire project in India, Pakistan and Bangladesh, a number of fields where women have benefited from the use of Online and Distance Learning (ODL) in secondary and skill-based education. A large majority of women who participated stated that the training had a positive impact on their "*access to economic opportunities*" and also reported an increase in their *"ability to make their own health decisions"* and access resources as well as in their understanding of their social rights.

[2] The WorldReader platform is aimed at young people, and according to the study cited: "*the average survey respondent was 24 years old. Over 90 per cent of the survey respondents were aged 35 and below, and two-thirds of respondents were under 24 years old.*"

3.1.4. Risk of widening the gender divide

While technology-assisted education can be hugely beneficial to girls and women, the use of technology will only create increased segregation if gender is not considered at every stage. Any educational projects that look to leverage technology must always attend to the "*gendered nature of human interactions with technology in the design and implementation of the program [or risk] exacerbating existing gender and related divides*" (Steeves & Kwami, 2017: p.184).

An awareness of this should be in place before a teacher steps into the classroom, and unless teacher professional development includes instruction in inclusive and gender- responsive teaching and learning, teachers may be liable to reinforce gender stereotypes and divisions. The challenges of this are likely to be particularly felt where there is a lack of female teachers as role models, such as in Uganda where (as of 2016) less than 25% of secondary school teachers were female (Okudi, 2016).

3.2. Equity of access to technology

This section explores the literature on the equity of access to technology in girls' education. Most sources acknowledge that women and girls are rarely afforded equal access to technology when compared with their male counterparts. The result of this gendered disparity appears to be an inequitable distribution of educational benefits that come with the use of technology. Four sub-themes emerged in the literature discussing this topic and these are discussed in turn.

- Attitudinal bias: Girls' access to and usage of technology are governed by socio-culturally constructed gender norms, values, and practices, which in turn reinforce inequities in the following points.
- Unequal access to technology within schools: It is generally noted throughout the literature that girls tend to have unequal access to technology facilities inside the classroom setting.
- Unequal access to technology outside of school: It is noted throughout the literature that girls have unequal access to technology outside of the institutional spaces of the school due to gendered household attitudes and roles, cost, and fears for security. This limits their access to formal and informal educational content and further impacts upon their technology experience and literacy.
- Self-regulation: Through socialisation and the performative practice of certain gender roles, girls can come to self-regulate their own access to technology.

3.2.1. Attitudinal bias and access disparity

Most of the 39 studies reviewed acknowledged that there is a significant gender digital divide in low-income countries resulting in girls having significantly less access to technology. Studies suggested that this disparity was rooted in broader attitudinal gender biases prevalent in attitudes about girls and technology. Several studies noted that girls were discouraged or limited from using technology because of restrictive socio-cultural values and beliefs vis-à-vis gender roles and interests. For example, drawing on her work in Kenya, Zelezny-Green (2011) suggests that ownership and usage of technology are commonly framed as 'masculine'. Based on their work from Cameroon, Central African Republic, Congo and Swaziland, Meno (2012) and Vilakati (2014), find that these pervasive gender biases are reflected and reinforced by the girls' parents, their school teachers, and the students themselves and this results in girls showing less interest in science and technology subjects at the school level and beyond.

3.2.2. Unequal access to technology within schools

The literature reviewed generally suggested that female students have less equitable access to technology resources at school, but this was rarely evidenced in any substantive way. Were and colleagues (2011) make the point that girls in low-income countries are more likely to be deprived of opportunities to access technology within schools because they are less likely to consistently attend school in the first place.

Both Were and colleagues (2011) and Meno (2012) suggest that girls have less access to technology within the classroom when compared to boys. That said, Meno (2012) also asserts that unequal access within schools was rarely the result of the unavailability of necessary hardware or infrastructure; rather, it was due to pervading existing gendered assumptions about the use of technology.

Were and colleagues (2011) suggest that teachers can exhibit biases against girls by having lower expectations about their technology competence than their male counterparts. Teachers may also believe stereotypes about which children will enjoy or benefit from using technology, and allocate technology accordingly (Pitchford et al., 2019). Because of their different educational expectations, teachers are more likely to encourage male students to take computer or technology-based courses. Girls, on the other hand, are deterred from enrolling in these classes (Meno, 2012).

3.2.3. Unequal access to technology outside of school

It is outside of the institutional spaces of school that unequal access to technology — and any concomitant educational benefits — is most evident. A number of the studies, which primarily covered countries in sub-Saharan Africa, suggested that girls have unequal access to technology outside of the classroom due to gendered household attitudes and roles, cost, fears for security, and control over their mobility. This also impacts upon their technology experience and literacy and their informal out-of-school learning. The evidence suggests that girls who were previously enrolled in school before closures due to the pandemic may experience greater learning loss than boys while schools are closed.

Were and colleagues (2011), Meno (2012), Basavaraja & Sampath Kumar (2017) and Steeves & Kwami (2017) all reported that male students had more freedom to use computers for both study and leisure outside of the classroom. Males were more likely to have the time, financial ability and freedom of mobility to be able to access technology in the spaces of their homes or at shared community spaces such as cyber cafés. As Steeves & Kwami (2017: p. 185) state, "*The fact that boys had more free time after school, had the freedom to be more mobile and less housebound, and could visit Internet cafés... allowed more boys than girls to acquire experience and fluency in using a computer and the Internet.*" The use of technology in these settings gave male students access to informal technology training and skills.

By contrast, many of the studies reported that girls were not encouraged to access or use computers outside of school. For example, Meno (2012) found that parents who had access to a computer at home often did not demonstrate to girls how to use it because they thought it was unnecessary or morally dangerous. Similarly, Were and colleagues (2011: p. 41) stated that "*among families who own computers boys will have more access to using the computer than girls*".

Some of the studies also intimated that girls are also less likely to have the temporal or financial resources needed to access technology outside of school. Were and colleagues (2011), Zelezny-Green (2018) and Steeves & Kwami (2017) all noted that girls are often expected to undertake household chores and contribute to the family income to a much greater extent than boys. As a result, they had limited time or disposable income to access technology or engage with educational material that might be subsequently provided through such technology.

Moreover, Were and colleagues (2011), Meno (2012), Basavaraja and Sampath Kumar (2017), and Steeves and Kwami (2017) note that girls are less likely to be able to access technology in shared community facilities such as Internet

cafes or computer centres because of gendered socio-cultural assumptions. Steeves & Kwami (2017: p. 185) suggested that in Ghana girls were discouraged from visiting cyber cafés as they are considered an "*unsavory environment and girls face stigma in these spaces due to the access to pornography and fraudulent activities*". Some cafes, they noted, do not even permit entry to girls. Meno (2012, p.18) also observed negative public opinion about girls who go to the cyber café. As a result, she found that some girls were afraid to work in cyber cafés.

More recently, however, Zelezny-Green (2018) sounded a more hopeful note in her exploration of the role of mobile telephony in enabling more equitable access to technology for girls outside of school. She states that there is an increasing indication from the literature that, "*girls in the global South access mobile phones after school in ways they choose themselves – sometimes involving formal learning and other times not*" (Zelezny-Green, 2018: p. 302). She also found in an earlier study that educational content access through mobile phones could ameliorate the interrupted school attendance of girls (Zelezny-Green, 2014). Potential inequities of access to different types of devices should also be taken into account in designing such programming and content.

3.2.4. Self-regulation

While socially-constructed gender biases were primarily reinforced by parents and teachers, a number of studies intimated that girls came to inhabit these beliefs and values and self-regulate their use of technology. Illustrating this, Meno (2012) and Vilakati (2014) acknowledge that even when girls were afforded the same functional access to technology as their male counterparts (whether in school or otherwise), their usage was further restricted by a lack of confidence, fear, mistrust and disinterest. For example, Meno (2012) notes that some female participants suffered from "*technophobia*" and were afraid of breaking the computer hardware.

Others felt uncomfortable using the internet and were wary of visiting certain websites without prior knowledge of what would be on them. Zelezny-Green (2014) observed similar reticence in her study on the educational potential of mobile phones in Kenya. Here, some girls had reservations about using mobile phones as they had observed them being, "*used inappropriately for social purposes*" (Zelezny-Green, 2014: p. 71). Males, on the other hand, are socialised to have a more positive and confident attitudes towards computers.

3.3. System readiness

This final section briefly considers the literature on the readiness of systems and infrastructure in LMICs to use technology to facilitate an improvement in girls' education. It is worth noting that most of the sources focus on Africa. There are three sub-themes emerge which are discussed in turn:

- Teacher training and professional development: The most consistently mentioned challenge is a general lack of both qualified teachers and ongoing professional development training, in parallel with a specific lack of training in technology use and gender-responsive teaching.
- Educational systems: Alongside inadequate teacher training, many studies found that the existing curricula and pedagogy in many LMICs discriminate against female students.
- Policy and government buy-in: Another key impediment mentioned in most studies is the lack of political will and/or clear mechanisms to implement existing policies which advance the use of EdTech and promote girls' education.

3.3.1. Teacher training and professional development

The literature consistently emphasises the crucial role of teachers in raising standards of teaching and learning, irrespective of technological advances: "*educational tools and technologies will continue to improve; nevertheless, teachers, not technology, will determine the quality of education in the foreseeable future*" (Saxenian, 2012).

Most studies highlight a lack of well-trained teachers as a key obstacle to improving the quality of educational provision (Ezzeh & Okoh, 2019; Giles, 2004; Kinyanjui, 2016; Okudi, 2016; Zelezny-Green, 2011). The studies refer to a lack of qualified teachers, to the poor quality of teacher training and ongoing professional development, and to the limited use of technology within much current teacher training.

As Okudi (2016) states: "*the majority of African education institutions do not have enough instructors equipped with computer and internet skill*", arguing that significant additional investment in this area is needed. Within this, it is noted that gender-responsive pedagogies, and the integration of approaches that are empowering to girl learners, can be particularly difficult for teachers in LMICs because of pre-existing constraints.

3.3.2. Educational systems

Inadequate teacher training and a lack of continuous professional development for teachers is just one factor identified in the education systems of the countries studied as contributing to poor learning outcomes and specific challenges for girls. In addition to unqualified teachers, Kinyanjui (2016) emphasises the significance in Kenya of an "*overloaded and irrelevant curriculum, lack of instructional materials, inadequate teacher contact hours and overcrowded classrooms*" in contributing to low learning outcomes.

Similarly, Okudi states that Uganda has a "*highly academic but irrelevant curriculum*" which disadvantages girls as it depends on memorising large sections of content, which girls have less time to do as they have many time-consuming domestic chores. Okudi suggests that rather than mitigating the challenges posed by unequal access to education for girls, certain aspects of the current Ugandan education system have resulted in the perpetuation of a culture and traditional values that disadvantage girls in school. She states that "*gender discrimination, stereotypes, and inequalities are transferred from the community to the school and manifest in textbooks, subject choices, subject content, teachers' delivery and school management*".

In Nigeria where technology-facilitated education is already somewhat established at both higher education and teacher training levels, a number of studies explored the possibility of expanding ODL to lower levels of education in Nigeria in order to promote more opportunities for girls remaining in education. Similarly, ODL is being implemented at both college and university levels in Kenya and Righa (2013) and Sarumi and Omazu (2013) urge secondary institutions to learn from the success and experience of these programmes. Gender disparity in accessing education exists from the first years of school, so Sanangurai (2016) stresses that unless gender dynamics are considered when implementing ODL at a primary and secondary level, girls will continue to be disadvantaged and access to education will be further segregated.

3.3.3. Policy and government buy-in

A supportive policy environment and framework at the national level was also identified by many of the studies as a crucial factor in the successful integration of technology into education systems and in particular in enhancing female access to education (Ezzeh & Okoh, 2019; Kinyanjui, 2016; Okudi, 2016; Steeves & Kwami, 2017).

While most countries do have laws, institutions and policies to promote technology usage and to eradicate the gender bias in education, implementation is often weak due to a lack of political will or clear

mechanisms to implement the constitutional gender provisions (Kinyanjui, 2016). Okudi (2016) suggests that some of these policies were developed more to fulfil international obligations than because they were a key government priority. She points out that Uganda has numerous policies and initiatives to support girls' education but they have made little impact on gender divides and questions the country's capacity to tackle the issues affecting girls' education in terms of "*implementation of policies and programmes through commitments, planning, budgeting, resourcing, training, supervision, monitoring, coordination, evaluation and reporting*".

Evaluating the One Laptop Per Child project in Ghana, Steeves and Kwami (2017) suggest that integrating gender into technology policies had been hampered by a lack of political will and that these policies had "*either been sidelined, forgotten over time, or not been seriously pursue*d". In addition to a lack of political will, some studies (Ezzeh & Okoh, 2019; Okudi, 2016) cite a lack of coordination and integration between different government departments and multiple stakeholders as a limiting factor in the usage of technology to improve girls' education.

4. Synthesis

This RER demonstrates that when barriers are removed and female students are given full and undiscriminated access to technology and technology-enabled education, girls repeatedly respond with a high level of engagement. Furthermore, some studies indicate that access to technology in education has shown to be disproportionately more empowering for girls and women than for boys and men. Finally, the range of benefits that female students derive from technology expand beyond the realm of formal education and empower them in other areas of life, with reported benefits such as an increase in access to economic opportunities or a greater ability to make informed decisions about their own health.

However, in the majority of cases girls are not currently enjoying full and undiscriminated access to technology and there are a number of external and internal barriers to engagement identified in the literature. Most studies acknowledge that there is a significant gender digital divide in low-income countries resulting in girls having significantly less access to technology compared to boys. The evidence suggests that this disparity is rooted in the broader gender biases prevalent in attitudes to girls and technology. It is also suggested that these gendered assumptions about the use of technology do not stop at the school gates but are implicit within the classroom setting, where girls are afforded less access to technology than their male counterparts. This is primarily due to widespread teacher bias that girls are less competent in technology usage and/or will not enjoy or benefit from technology usage. This in turn means that teachers are less likely to encourage female students to take computer or technology-based courses.

Studies consistently mention endemic problems with teacher training and professional development in LMICs, particularly in Africa. These concerns encompass, among other areas, the standard of teacher training and instruction both in the usage and application of technology and in inclusive and gender responsive teaching.

A key concern that runs through all three sections of this rapid evidence review is that while technology-assisted education can be hugely beneficial to girls and women, the use of technology will only create increased segregation unless gender is considered at every stage and, crucially, that teachers are trained to resist rather than reinforce gender stereotypes and divisions. Alongside concerns about teacher training, many studies also note systemic problems with curricula and pedagogy which disadvantage female students. Currently, neither educational reform nor teacher training seem to be

government priorities in many countries, with most studies identifying a lack of political will or mechanisms to implement policies to advance the use of EdTech and girls' education.

It is noted throughout the literature that girls also have unequal access to technology outside of school due to gendered household attitudes and roles as well as cost and security fears. These factors limit girls' access to formal and informal educational content and impact upon their technology experience and literacy. Some studies also suggest that girls have come to self-regulate their own access to technology as they have internalised these gendered beliefs and attitudes.

A limitation of the literature is the lack of exploration of any differences in girls' access to various forms of technology, and also the differentiation in access between different groups of girls. Most of the studies reviewed understood technology to mean a computer or tablet, rather than more widely accessible and low-cost devices such as radios or mobile phones. Actively using more diverse forms of technology might go some way to addressing the significant problems with access to power and connectivity in many low-income countries that must be considered in any discussion about girls benefiting from technology-enabled education.

Surprisingly, none of the studies reviewed explore the potential of technology to overcome or alleviate the challenges of gender bias present within existing education systems. For example, further investigation is needed regarding the potential for technology to improve education for girls through the joint provision of teacher training on effective use of technology and on effective gender-responsive pedagogies.

Finally, a crucial issue that warrants more attention than it has received in the literature is the importance of understanding safeguarding issues particular to female students, including the necessity of safeguarding girls from the risks associated with the use of technologies.

5. Annex A: Bibliography

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6. Annex B: Search terms

Source	Search terms	Records returned	After screening
GS	"girls education" ICT	3430	7
GS (>2008)	"girls education" ICT	2670	35
GS (>2008)	gender primary "education technology" Africa	8,730	
GS	"girls education" "education technology"	435	3
GS	GEC ICT	4540	NA
GS (>2008)	"girls education" "technology" "developing countries"	7220	7
GS	"girls education" "ICT for Education"	63	2
GS	"girls education" "digital learning"	156	6
GS	allintitle: "ict" "girls education"	1	1
GS	"girls education" "ed-tech"	29	0
GS	ODL girls education	2570	~8
GS (>2008)	"education for girls" "ICT"	1170	3
GS (>2008)	"girls education" computer aided learning	2650	26
GS (>2008)	"girls education" "distance learning"	1,100	0
GS (>2008)	"girls education" "ICT Africa"	26	3
GS (>2008)	"girls education" "ICT South Asia"	0	
GS (>2008)	"girls education" "ICT South America"	0	
GS (>2008)	gender divide "primary education" ICT	16,900	15
GS (>2008)	ICT4E girls	451	0