EdTech Hub

Clear evidence, better decisions, more learning.

Participatory Development Associates Ltd.
... evervone matters

TECHNICAL REPORT

Voices and Evidence from End-Users of the GLTV and GLRRP Remote Learning Programme in Ghana

Insights for inclusive policy and programming

Authors Raymond Hodor
Ernest Adu Owusu
Lucy Ofori-Davis
Alexander Afram
Clement Sefa-Nyarko

DOI 10.53832/edtechhub.0064

THE WORLD BANK

UKaid
from the British people

#EdTechHub @GlobalEdTechHub edtechhub.org

About this document

Recommended citation

Hodor, R., Owusu, E., Ofori-Davis, L., Afram, A., & Sefa-Nyarko, C. (2021). *Voices and Evidence from End-Users of the GLTV and GLRRP Remote Learning Programme in Ghana. Insights for inclusive policy and programming*. Technical Report. https://doi.org/10.53832/edtechhub.0064. Available at https://docs.edtechhub.org/lib/2A5NQEV8. Available under Creative Commons Attribution 4.0 International, https://creativecommons.org/licenses/by/4.0/.

Notes

EdTech Hub is supported by UK aid and the World Bank; however, the views expressed in this document do not necessarily reflect the views of the UK government or the World Bank.

Acknowledgements

PDA gratefully acknowledge the cooperation received from the representatives of the Ministry of Education Service, Plan International, Mastercard Foundation, and Lively Minds during data collection. Special thanks go to the EdTech Hub team — Kate Jefferies and Taskeen Adam — for their insightful feedback and comments that shaped the content of this study. We are also thankful to all the communities and study participants who shared their views and experience.

Reviewers

Sanchin Gathani, Bjoern Hassler, Taskeen Adam, and Kate Jefferies

Contents

Figures

Tables

Abbreviations and acronyms

CENDLOS	Centre for National Distance Learning and Open Schooling
FGDs	Focus Group Discussions
GBC	Ghana Broadcasting Corporation
GES	Ghana Education Service
GhLA	Ghana Library Authority
GhLApp	Ghana Library Reading App
GLRRP	Ghana Learning Radio and Reading Programme
GLTV	Ghana Learning Television
ICT	Information communication technology or technologies
IRI	Interactive Radio Instruction
JHS	Junior High School
KG	Kindergarten
KIIs	Key-informant interviews
MoE	Ministry of Education
NaCCA	National Council for Curriculum and Assessment
NGO	Non-governmental organisation
PDA	Participatory Development Associates
RISE	Radio Instruction to Strengthen Education
SMS	Short Message Service
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development

Executive summary

Government and relevant stakeholders have made efforts to reduce the impact of Covid-19 on Ghana's educational system. However, as with many education systems around the world, Ghana's education system was not prepared for the Covid-19 pandemic and lacked the resilience needed to adjust to the crisis. This led to disruptions to learning, loss of contact hours and learning support from teachers. The application of technology to teaching and learning has the potential to improve the robustness of education systems, limiting the impact of unexpected occurrences while ensuring quality education (↑Coflan & Kaye, 2020). This study provides an assessment of EdTech use and its effectiveness for teaching and learning in Ghana during the Covid-19-related school closures, using the Ghana Learning Television (GLTV) and the Ghana Learning Radio and Reading Programme (GLRRP) as case studies. By assessing the EdTech environment in Ghana, the study explores blended means of enhancing teaching and learning for all learners (particularly girls, learners with disabilities, and out-of-school and non-returning-to-school children) through EdTech in the post-Covid-19 era. Our research sets out the views and perspectives of end-users of the GLTV and GLRRP from urban and rural locations throughout Ghana, in the Greater Accra, Ashanti, and Northern regions.

Key findings

Virtual lessons did occur, but these were organised by individual teachers on an ad hoc basis

One-fifth of teachers interviewed had engaged in and were continuing to take virtual lessons via WhatsApp. The virtual engagement in schoolwork was to make up for the disruption in the school calendar and loss of school hours in rural and urban areas. This was an initiative by individual teachers to engage with their pupils or students, but not a school- or government-organised activity.

Children's participation in (remote) learning activities during school closures was dependent on domestic and income-earning commitments

At home, caregivers instructed children to learn with minimal or no supervision, or children were assisted by close relatives or hired tutors. Learners also took the opportunity to participate in remote learning. Of children in rural and urban areas 78% and 29% respectively reported little to no engagement in learning activities because they assisted their caregivers with domestic work, farming or fishing, or took on livelihood activities to earn

income to support the home. In that regard, learners with disabilities were more involved in learning activities than learners without disabilities.

The long-term school closures affected the academic performance of children who were not actively engaged in learning activities during the school closures

Struggling to recall what was taught before schools closed made learning difficult for children who were not actively engaged in learning, leading to poor academic performance. The disadvantages were disproportionate for underprivileged learners whose educational opportunities were limited beyond the traditional schooling system.

Long-term school closures increased the dropout rate

The interests and priorities of some learners were diverted during the long 'vacation'. While some engaged in commercial activities to support their families because the flow of income for their parents had been interrupted, others went into apprenticeships. Some got lured into sex for money, which negatively affects girls returning to school due to teenage pregnancies. Aside from these, some parents were also sceptical about the safety of their children, hence they either prevented them from returning to school or only allowed them to return sometime later after reopening.

Access to GLTV and the GLRRP was limited due to a lack of awareness of the programmes and lack of the requisite hardware and infrastructure

Although GLTV and GLRRP had wide coverage, the reach of GLRRP was curbed by the non-availability of radio stations in some rural communities. As a result, in the Northern Region, GLRRP content was downloaded onto pen drives and played in mosques. At the household level, a lack of radio and television inhibited access to GLTV and GLRRP remote learning programmes. Access among the marginalised and learners with disabilities was boosted in communities in Ada West by the support of the non-governmental organisation (NGO) Plan International.

The GLTV and GLRRP remote learning programmes were beneficial and useful to those who had access

Parents and teachers reported building their capacities, while learners, parents, and teachers reported that the learning programmes helped improve learning outcomes. Hence, blended, in-person and remote learning are being adopted in some schools.

Learners with disabilities benefit more from remote learning than going to school

Remote learning programmes like GLTV and GLRRP enable learners with physical disabilities to participate effectively in teaching and learning from the comfort of their homes. Given that most school environments are not disability-friendly, children living with disabilities appreciate the remote learning programmes more as it saves them time and energy of moving to and from school.

The role of caregivers in reducing household chores and providing materials contributes to success

Caregivers reducing household chores, stopping children from doing domestic work and providing learning materials like chairs, pens, and technological gadgets like TV and radio enhances participation in remote learning and contributes to making the use of EdTech successful and effective. The role of caregivers is pivotal to making the use of EdTech successful and effective. The supervisory and supportive roles of caregivers enhance access and participation in remote learning programmes.

Teachers playing an active role increases access and participation

Teachers checking on learners, providing motivation and sharing relevant information with caregivers and learners helps increase access and participation in remote learning programmes. Thus, the relevance of teachers in enhancing teaching and learning through EdTech extends beyond contact hours in the classroom and school boundary. Learners reported receiving guidance and motivation from teachers to learn.

Recommendations

1. Awareness creation through advertising and public sensitisation are essential

Awareness creation through advertising, and public sensitisation to the importance of education and the joint role that must be played by teachers and parents, are needed. The collective effort of relevant stakeholders is required in using EdTech to improve teaching and learning outcomes and in drawing the marginalised into the education system. Hence, government and other stakeholders should intensify initiatives to raise awareness of the importance of education and of the role of all stakeholders.

2. Strengthen engagement between schools, communities, and homes

The education system needs to strengthen engagement between schools and parents, to provide guidance on how to structure, schedule and monitor homeschooling. This could be done by strengthening collaboration and accountability between school management committees, parent–teacher associations and the schools at the community level. The school management committees particularly need to be empowered to live up to their responsibilities of instilling teaching and learning accountability in schools.

3. Build the capacity of teachers to support remote learning

The significance of the part that teachers play in achieving teaching and learning outcomes cannot be overemphasised. The adoption of EdTech interventions in Ghana's education system must be matched with the requisite knowledge and skills. Teachers' inability to handle virtual lessons and remote learning calls for extensive training. Technology such as the TV, and web-based platforms such as Google Meet and Zoom, make it less costly for training to be organised remotely. Capacity-building in EdTech for teachers should also be integrated into the teaching curriculum at the Colleges of Education so that the teachers graduate well-equipped to assist students in the rapidly changing education environment.

4. The Ministry of Education and Ghana Education Service must provide the requisite technology

The Ministry of Education (MoE), the Ghana Education Service (GES) and relevant stakeholders should assist teachers and learners by providing the requisite technology and infrastructure to support teaching and learning through digital means. This has often been lacking in the education sector in Ghana. In order to leverage the potential benefits that technology can provide to improve access to, and quality of, teaching and learning, schools need access to stable electricity and devices. Any provision of devices, however, needs to be supplemented with maintenance support and teacher professional development to ensure the devices are used effectively in teaching and learning.

5. Integrate radio and TV lessons into main school activities

To improve access to and continued participation in the GLTV and GLRRP remote learning programmes now that schools have reopened, as well as to support under-trained teachers, lessons can be integrated into main school activities and telecast on multiple platforms to reach a wider range of learners.

6. Download GLTV and GLRRP content onto pen drives to share with teachers, parents, and learners

This would increase access and serve as reference material for teachers and learners. Making the content distributable using cell phones would also enhance reach and access.

7. Promote inclusivity through accessible and effective remote learning programmes

The empirical findings suggest that the marginalised, including learners with disabilities and children who are out of school, benefit from remote learning programmes. Hence, continuing and improving the GLTV and GLRRP programmes can enhance the inclusivity of the marginalised in education.

1. Introduction

This study assesses the extent to which two national EdTech interventions — Ghana Learning Television (GLTV) and the Ghana Learning Radio and Reading Programme (GLRRP) — provide continuous teaching and learning to students at basic and senior high schools in Ghana during the Covid-19-related school closures. More importantly, we use these findings to provide policy guidance and innovative programming options to roll out blended and low-tech EdTech options that work well and are more effective for learners of diverse social, economic, and geographic backgrounds at the basic and second-cycle levels in Ghana.

1.1 Background to the study

Educational technology (EdTech), which has the potential to improve teaching and learning outcomes and make schools inclusive for all learners (including children with special education needs and disabilities), has seen a substantial increase in use over the years (↑Coflan & Kaye, 2020). In attempts to harness this potential, governments, policymakers and relevant stakeholders have invested in and adopted several EdTech interventions in developed and developing countries. Ghana is not excluded from this practice and several tech-aided teaching and learning interventions have been implemented in the country. Some of these EdTech interventions are adjunct to, or blended with, traditional classroom teaching and learning; others promote and support remote learning using television, radio, and online platforms.

Examples of EdTech interventions that promote blended teaching and learning include: the Open Learning Exchange; Ghana's 'Read' programme; Impact(ed) International's (formerly Discovery Learning Alliance) use of audio-visuals to stimulate and enhance teaching and learning; Participatory Development Associates (PDA's) 'phonic-by-phone'; and WorldReader's Kindle programme. In addition, the government has implemented online platforms such as iBox, iCampus, and the Ghana Library Reading Application (GhLApp) to promote remote learning. The state has also implemented GLTV and the GLRRP to support remote learning through television and radio technology. GLTV and the GLRRP were implemented to complement other remote learning interventions, such as Joy Learning TV and Class Act (which are privately owned), in response to the closure of schools because of the Covid-19 pandemic (↑Agbe & Sefa-Nyarko, 2020).

A rapid scan of EdTech in Ghana by ↑Taddese (2020) identified about 13 large-scale, private-sector-led EdTech interventions — including Eneza Education, Making Ghanaian Girls Great and Local Content for African Libraries. These interventions are offered at various educational levels, from

kindergarten to tertiary level, in private and public schools. The programmes largely target learners across the country in rural or deprived locations with critical social and economic infrastructure deficits, to support access and active participation.

At the national level, government agencies such as the Ministry of Education (MoE), Ghana Education Service (GES), Centre for National Distance Learning and Open Schooling (CENDLOS), Ghana Library Authority (GhLA), Ministry of Communications and the National Information Technology Agency implement and support EdTech initiatives in the country. In addition, development partners, donors and NGOs like the World Bank, UNICEF, USAID, Plan International, Right to Play, and many others have supported EdTech interventions in Ghana. It is worth stating that most EdTech programmes are externally funded. In other words, the government of Ghana's funding for EdTech initiatives is insufficient (↑Taddese, 2020). CENDLOS that was set up in the mid-2000s to support distance learning has remained largely under-resourced. Moreover, the Ghana Education Strategic Plan 2018–2030 does not mention EdTech at all, although there is provision for mainstreaming information and communication technology (ICT) use into education and strengthening CENDLOS.

1.1.1 GLTV and GLRRP

GLTV is a Government of Ghana initiative aimed at delivering lessons to primary- and secondary-level students in their homes via television. It is a distance-education programme for students who are at home during school closures. To ensure effective and quality teaching and learning, the MoE and GES engaged the services of master trainers and teachers who were trained and supervised by Plan International to produce and deliver interactive content. The delivery mimics that of a physical classroom session, with a nationwide timetable that allocates a period to each subject as well as breaks, just as would be done at school. In addition, the content was developed in accordance with the new curriculum developed by the National Council for Curriculum and Assessment (NaCCA).[1] The core subjects of English language, mathematics, science and social studies are telecast on GLTV. Sign language is also integrated for learners with hearing impairments. In other jurisdictions, such as Sierra Leone, similar radio and television programmes provide measures for learners to ask teachers questions, using toll-free lines. However, GLTV does not have this component for learners to interact directly with the lesson facilitators.

[1]The National Council for Curriculum and Assessment (NaCCA) is responsible for the development and determination of its advice on matters relating to curriculum and assessment.

The Ghana Broadcasting Corporation (GBC), through an agreement with GES and MoE, dedicated a 24-hour free-to-air channel for educational content made available by the GES during the Covid-19-related school closures. Despite the aim of providing education for all via this platform, the infrastructure deficit in the country presented inequalities and inclusion challenges for children from marginalised and deprived communities in rural households and those of the urban poor that often have no access to electricity, a television, and radio (↑Agbe & Sefa-Nyarko, 2020).

With support from USAID, the GES and MoE implemented the GLRRP to provide learning content for children from primary one to primary three via local radio stations. The aim of the GLRRP was to help children who were at home because of the Covid-19 pandemic to read using interactive radio instruction (IRI). Lessons were based on USAID-supported content with validation from the NaCCA. The GLRRP sought to improve the reading, writing, and imaginative skills of children by engaging them in games, storytelling, and other interesting activities to nurture these skills. The programme contained lessons approved by the GES, in English and the most widely spoken 11 Ghanaian languages — Asante Twi, Akuapem Twi, Dagaare, Dagbani, Dangme, Ewe, Fante, Ga, Gonja, Kasem, and Nzema — which aired two days a week, on Mondays and Wednesdays. To complement the content on the GLRRP, workbooks were distributed to children from primary one to three to aid their learning at home across the country, targeting rural areas in particular. The programme also sought to engage with caregivers and parents as supervisors of children at home, by sharing messages on child protection, homework supervision, family health and hygiene and the prevention of bullying, sexual assault, and early pregnancy. They also included Covid-19 safety tips on handwashing and social distancing. These lessons were expected to help improve the learners' academic performance as well as inculcate positive behaviour. Figures 1 and 2, below, are a graphic representation of the GLTV and GLRRP remote learning programmes respectively.

Figure 1. *Pictorial overview of GLTV. Source: PDA Comms Design.*

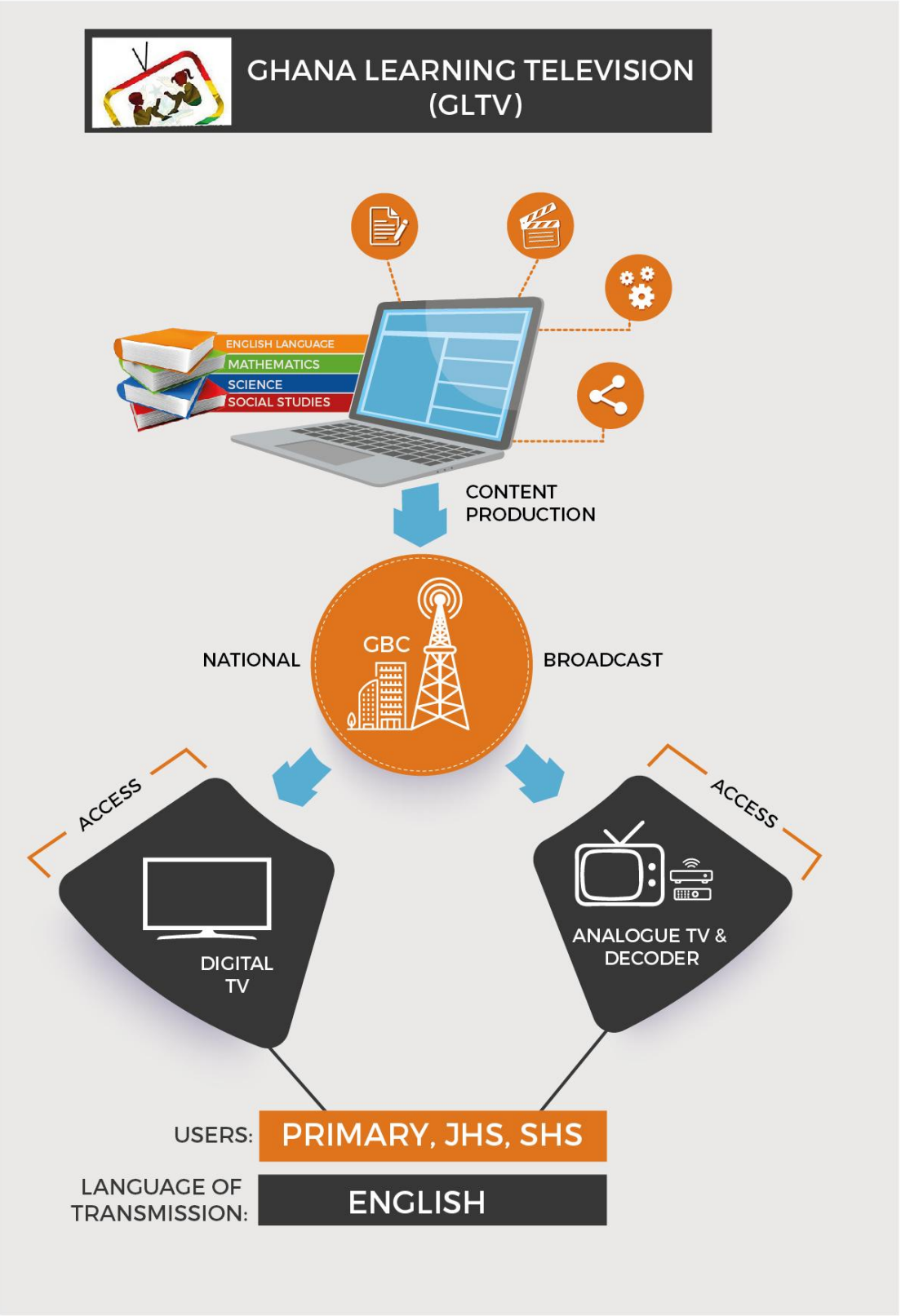
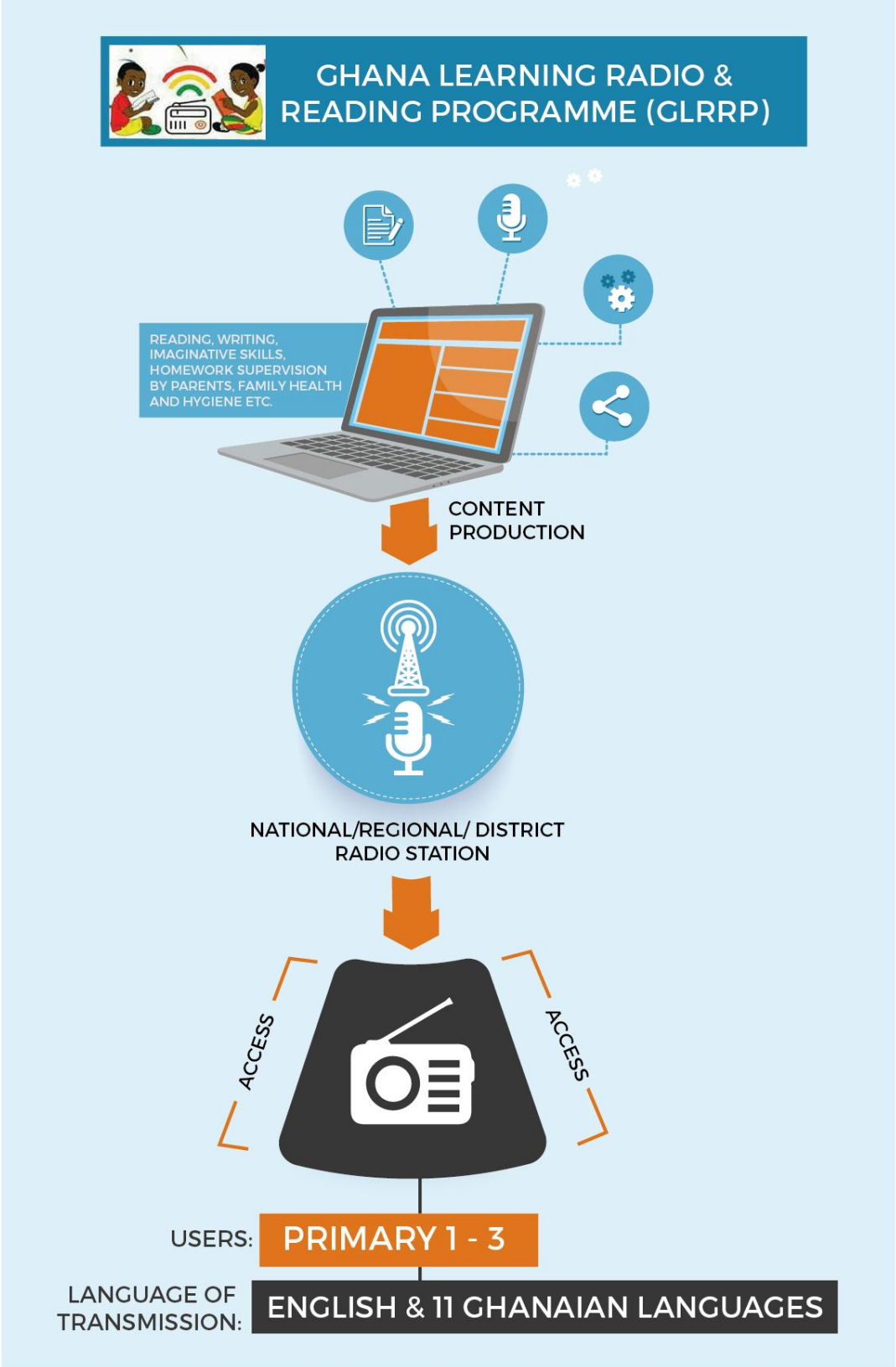


Figure 2. *Pictorial overview of GLRRP. Source: PDA Comms Design.*



1.2 Context of the study

The Covid-19 pandemic has affected all education systems worldwide. However, the impacts of the pandemic on continuous teaching and learning have been, and continue to be, felt differently based on countries' abilities to deploy innovative learning solutions that work effectively for all categories of learners. This has largely included the deployment of technology and remote learning solutions. In March 2019, the Government of Ghana, through the MoE and GES, closed schools indefinitely to curtail further spread of Covid-19 in the country. Following the school closures, the MoE and GES introduced television, radio, and other virtual learning programmes for primary and high-school students, intended to provide continuous learning for basic and second-cycle learners across the country. Among the flagship EdTech responses to the teaching and learning disruptions posed by Covid-19 were GLTV and the GLRRP, aired by the national broadcaster — GBC. GLTV and the GLRRP received further support from development partners such as UNICEF, USAID, Plan International, and the nonprofit organisation known as FHI 360. In addition to these nationwide EdTech interventions, private actors, such as media houses, NGOs, and private schools introduced television and virtual learning programmes to augment the government's efforts.

Television, radio, and online learning programmes have been lauded by stakeholders as innovative and seemed inevitable in a time of school closures; however, the available evidence suggests that these programmes were inaccessible to most school children (learners) and out-of-school children in rural and low-income households in Ghana due to social, economic, and infrastructural deficits (↑Agbe & Sefa-Nyarko, 2020). In Kenya, only 22% of children in poor households could access remote learning during the pandemic (↑Uwezo, 2020). A case study conducted by ↑Agbe and Sefa-Nyarko (2020) on EdTech programmes in Ghana during the peak of the pandemic identified the lack of access to electricity, television sets, computers, the internet, and radio by most urban poor and rural households as factors that constricted access to these digital learning interventions. Other factors, including gender roles and digital illiteracy, also affected accessibility and the effectiveness of learning, for girls and children from urban poor and rural households.

Comparing Ghana's state-run TV and radio programmes with similar interventions in other jurisdictions, some differences in terms of added components and hours of content delivery were evident. In Côte d'Ivoire, educational lessons delivered via TV and radio were complemented with remote courses available via Short Message Service (SMS) (↑World Bank, 2020). In Kenya and Rwanda, apart from a dedicated TV channel, a YouTube channel was created to ensure that students had access to educational materials

on-demand (↑World Bank, 2020). In Liberia and Sierra Leone, hotlines or toll-free numbers were provided for learners and caregivers to call to have their concerns addressed (↑World Bank, 2020). Whereas the GLRRP was broadcast twice a week with each lesson lasting an hour (↑Agbe & Sefa-Nyarko, 2020), in Kenya and Rwanda the radio broadcasts were aired from Monday to Friday for about six hours each day (↑World Bank, 2020). The phone-ins had the potential to make the TV and radio engagement more interactive, while the longer duration of the programmes could ensure that more users were reached.

1.3 What this paper adds to the knowledge base

In Ghana, teaching and learning provided by the state have traditionally been delivered in the classroom face-to-face. Very little attention has been paid to developing and scaling up virtual and / or remote learning options to reach children from rural, poor, and vulnerable backgrounds (the majority of the learners served by the public education system). While lessons delivered on television and supported by the MoE and GES for primary and junior-high-school (JHS) students existed before the Covid-19 pandemic, this was never intended as the main medium for teaching and learning. These lessons were thus mainly accessed by children in the cities and from upper- and middle-class and elite homes. For this reason, little research or evidence exists on how Ghana can roll out and operationalise EdTech interventions nationwide to work effectively for all categories of learners — rich, poor and rural learners, learners with disabilities, girls and children in communities with no access to electricity, a television signal or the internet, among others. All these challenges surfaced and were duly documented by recent reviews of GLTV and other virtual learning programmes that were implemented during the school closures (see ↑Agbe & Sefa-Nyarko, 2020). However, the study by ↑Agbe and Sefa-Nyarko (2020) that do acknowledge these difficulties do not offer comprehensive assessment and evidence or suggest how the MoE and GES can design EdTech interventions differently to meet the learning needs of all the different classes of children.

This research builds on that study by widening the scope of the discussion and generating new findings on GLTV and GLRRP remote learning programmes. The empirical and extended evidence from this research (see Section 4) provides reasons for designing evidence-informed policy and targeted interventions to improve the inclusiveness, accessibility, and effectiveness of nationwide EdTech programmes in Ghana.

1.4 Research questions

This study seeks to answer the following research questions.

1. How do the GLTV and GLRRP interventions meet the specific needs of marginalised groups?
2. To what extent were the GLTV and GLRRP interventions accessible to learners from marginalised groups in the context of Covid-19, and how could accessibility be improved?
3. To what extent did the GLTV and GLRRP programmes enhance educational outcomes during the Covid-19 pandemic, and what lessons can be learned?
4. How can technology be used to support and improve learning outcomes for marginalised children?

For the purpose of this study, the term marginalised groups include learners from vulnerable social and economic backgrounds in rural and urban areas, out-of-school children, and learners with disabilities.

1.5 Structure

The study is organised into six sections. Section 1 presents the introduction and aims of the study, background, context, and research questions guiding the study. Section 2 presents the review of literature in relation to television and radio as broadcasting technologies for remote learning and evidence on enhancing learning outcomes using these tools. Section 3 describes the research approach and methodology, and Section 4 presents and discusses the findings from the primary data gathered. The policy implications of the findings and conclusion are discussed in Section 5 and Section 6 respectively.

2. Literature review

There is a growing interest in the use of EdTech, particularly broadcasting technologies such as internet, radio, and television for educational purposes (↑Shettima et al., 2020).[2] EdTech has been adopted to help improve learning outcomes for students. The use of television and radio as a medium for teaching and learning has come to complement what is done in schools, and the importance of these media for learning has become more pronounced in recent times, especially since the advent of Covid-19, which compelled school activities to halt (↑Núñez, 2021). In responding to this phenomenon, actors within the educational space (policymakers, school authorities, learners and families) sought innovative ways for continued learning while children stayed at home (↑UNICEF, 2020a; ↑Núñez, 2021). Television and radio are traditional platforms that help children to learn and have remained a better option than other more modern technologies such as the internet, due to their ability to reach a wider audience, and those in hard-to-reach places (↑Shettima et al., 2020).

A review of the literature suggests that there are enormous benefits and opportunities in the use of television and radio for remote learning, as well as some small challenges. The following highlights the benefits, challenges and opportunities that come with the use of television and radio for remote learning.

2.1 Assessing the use of television and radio for remote learning: the benefits, challenges, and opportunities

It has been established that the use of EdTech has increasingly gained popularity, particularly recently, when the Covid-19 pandemic caused havoc in all aspects of society, including the education sector. In a survey conducted in Ghana by Innovation for Poverty Action (↑IPA, 2020), it was found that 64% of primary and 57% of secondary school children dedicated time to learn at home during school closures. EdTech has significantly transformed learning for pupils and teachers alike as governments and the private sector continue to diversify mass media technologies to enhance children's literacy development (↑Ullah et al., 2014; ↑Shettima et al., 2020).

Television and radio have been proven to have a significant effect on the speech of young learners. ↑Gocen and Okur (2013) have discovered that educational television has a considerable impact on speech training for children. Child learners can imitate and remember what they watch on

[2] In this study, we have focused on radio and television as tools for EdTech in Ghana.

television more than they can in a classroom setting (↑Gocen & Okur, 2013). To advance this argument, ↑Wright et al. (2001), in their study, observed that preschoolers who watched educational programmes on TV scored higher in their tests than their counterparts who watched general content. In support of this, ↑Borzekowski (2018) and ↑Borzekowski et al. (2019) found that remote learning through television improved educational outcomes in Rwanda and Tanzania, respectively. ↑Watson and McIntyre (2020) show that educational television promotes co-viewing, which enhances the learning of children, supports the achievement of learning outcomes, and achieves non-learning outcomes. According to the rapid evidence review by ↑Watson and McIntyre (2020), the inclusion of marginalised groups in educational television can reduce social bias among learners.

Given the enormous opportunities in remote learning for pupils, ↑Morris et al. (2009), in their report on the impact study of the Radio Instruction to Strengthen Education (RISE) programme in Zanzibar, revealed that not only did the RISE programme improve learning outcomes for students in the formal stream, it also helped children who were previously not part of the formal system meet expectations and catch up with their peers. ↑Trucano (2010) found that remote learning through radio has a positive impact on learning outcomes. ↑Yelkpieri et al. (2011) contended that educational radio is effective because radio is affordable compared to television, accessible with batteries in the absence of electricity, portable and now even accessible on smart and non-smartphones. ↑Damani and Mitchell (2020) argue that educational radio is effective in teaching language-related courses, gives access to those who cannot read, and encourages behavioural changes around good societal behaviours such as public health practices if these are broadcast alongside the educational content. Broadcasting educational radio content in local languages is believed to enhance caregivers' understanding and improve transparency. Hence, it can be employed for behaviour change and improving learning outcomes (↑Damani & Mitchell, 2020).

Notwithstanding the numerous benefits that accompany television- and radio-aided remote learning, there still exist challenges that require attention. The use of radio and television programmes for remote learning has been described as a one-directional interaction flowing from teachers to learners. In this modality, learners do not benefit from a teacher's assessment, feedback, and formative guidance. Secondly, it is argued that educational broadcasting does not allow room for children to participate in an interactive learning session. According to ↑Olumorin et al. (2018), in educational broadcasting, the task of teaching and learning is reduced. This, therefore, gives little opportunity for students to be actively involved in instructional activities (ibid). ↑Nasib (2017) also posits that in educational broadcasting there is a reduced interaction between the instructor and the learner. When remote learning is

done via radio, children find it more difficult to concentrate due to the absolute dependence on the aural sense, which constitutes only about 11% of children's learning ability (↑Nasib, 2017; ↑Olumorin et al., 2018).

However, the introduction of Interactive Radio Instruction (IRI), also known as educational radio, where the radio teacher delivers the learning content by guiding learners through interactive exercises using stories, songs, and role play, has been noted to improve teacher–learner interaction and learning outcomes. The storytelling approach used in the GLRRP is a component of IRI and could be improved by being deliberate about getting children to engage in remote group role plays. ↑Ho and Thukral (2009) identified that IRI encourages student participation, more so for younger learners than older learners, and IRI especially when combined with printed learning materials can improve learning outcomes. ↑Burns (2006) revealed that IRI programmes contribute to the professional development of teachers in Guinea.↑Trucano (2010) indicated that there is a long history showing that IRI is a low-cost educational technology that has a positive impact on teaching and learning in many developing countries. A key difference between the use of radio for broadcasting and IRI is the term 'interactive', which comes into play when both teachers and learners react verbally and physically to questions and exercises put forward by the radio presenter (↑Trucano, 2010). In spite of the positive results associated with IRI, sustainability remains a challenge, especially when donor funding expires. According to ↑Trucano (2010), the non-sustainability of IRI can be attributed to institutional constraints and less buy-in from political elites as the IRI programme largely focuses on poor rural areas.

It is also important to highlight the disparities that exist in accessing educational broadcasting. A survey conducted to assess the status of remote learning in Kenya during the Covid-19 crisis showed that access to EdTech-based learning was low and inequitable, such that only 22% of children benefited from digital learning and access to it was directly proportional to the learner's grade (↑Uwezo, 2020). Lack of radio, television, computers, smartphones, and the internet were cited as reasons for the low access to digital learning, similar to the constraints that ↑Agbe and Sefa-Nyarko (2020) found in Ghana. The report from ↑Uwezo (2020) also revealed that parental awareness of children's remote learning was low on average (about 20%), but with high variation by location due to knowledge about remote learning. According to ↑Morris et al. (2009), poor learners whose parents or guardians are unable to afford a television or radio set, are deprived of the opportunity to participate in remote learning. According to a UNICEF report, there is a stark disparity in household access to televisions within sub-Saharan Africa, and this is more pronounced for children from poor families (↑UNICEF, 2020b). Also, remote learning requires self-motivation and

self-driven learning; learners must be willing and committed to making use of remote learning platforms such as radio, television, and online portals (↑UNESCO, 2020). However, many learners — especially in the early grades — lack the skill to self-direct their learning. Parental interest in a child's learning is therefore critical to the uptake of EdTech interventions. Other challenges that may impede effective remote learning include poor transmission and lack of electricity especially for remote dwellers; distraction from the immediate environment, which can affect learner's concentration (↑Nasib, 2017); and the lack of culturally appropriate content, which may cause children to lose interest in what is being taught (↑Bonner et al., 2018).

Having noted the challenges in the use of radio and television as tools for remote learning, it is important to identify the opportunities. Recognising the lack of or insufficient interactivity in the use of television and radio for remote learning, parents and caregivers can leverage the media to engage with their children, to discuss the educational content broadcast, with the aid of workbooks and other educational materials (↑UNICEF, 2020b). For example, in Sierra Leone, scheduled lessons were delivered through radio and toll-free phone lines were opened to enable learners to interact with teachers. Therefore, teachers could spend more time remotely interacting with learners than they used to do during in-person lecturing. Similarly, in Estonia, teachers were allowed to adjust the curriculum and lesson plans based on time allocated to teacher–learner interaction (↑Barron et al., 2021). This helped make up for the lack of interaction in remote learning.

Radio and television as broadcasting technologies are cost-efficient and accessible to a larger audience, thereby promoting more equitable access than internet-based EdTech interventions (↑Watson & McIntyre, 2020). Radio as an educational broadcasting technology that promotes remote learning has the potential to bridge the access to education gap between rural and urban families, girls and boys and the marginalised in society (↑Damani & Mitchell, 2020). While both radio and TV platforms present immense learning opportunities and benefits, learners and teachers largely prefer educational content on television over radio due to the audio-visual features of the content shown on TV (↑Yelkpieri et al., 2011).

3. Methodology

This section details the research design and approach and discusses the selection of research sites, research participants, sampling, sample size, and data analysis. Ethical considerations and challenges are also explained.

3.1 Research design and approach

The focus of the research was to obtain an in-depth understanding of how nationwide EdTech interventions such as GLTV and GLRRP inclusively promoted effective continuous learning during Covid-19-related school closures and can continue to do so after the pandemic. Hence, qualitative and participatory approaches were used to gather insights from diverse stakeholders. The qualitative approach allowed the use of 'how', 'why' and 'when' types of questions for a deeper understanding and holistic assessment of our research questions relating to the reach, accessibility, usage, and effectiveness of GLTV and the GLRRP. The qualitative approach was also important to learn and identify gaps from the perspective of all the stakeholders — MoE, non-state actors, parents, and children — from different geographical contexts and social and economic statuses. In addition, the qualitative approach was participatory. This made participants feel relaxed and more confident to speak out and share examples, stories or scenarios that backed their responses. Data was gathered using focus group discussions (FGDs), key-informant interviews and in-depth interviews.

3.2 Selection of research sites

In Ghana, most of the infrastructural and development projects take place in the capital, Greater Accra, followed by the cities that are designated as regional capitals. Among other reasons, including climate and resource endowment, this has resulted in vast socioeconomic differences between the southern and northern zones of the country. The infrastructure deficit and poverty levels increase from the southern zone to the middle zone and further to the northern zone (↑GLSS, 2017). For this reason, we selected a region from each ecological zone to capture diverse perspectives and nuances from different ethnic groupings, socioeconomic and occupational backgrounds, educational infrastructure gaps and living standards that could impede or support access to and utilisation of EdTech interventions. Hence, three regions — one each from the northern zone (Northern Region), middle zone (Ashanti Region) and southern zone (Greater Accra Region) — were selected.

Data from the Ghana Living Standard Survey in 2017 (↑GLSS, 2017) shows that the number of persons aged 15 years or older who had completed school, as

well as ownership of a computer and ICT skills, declined from the southern to the northern zone of Ghana (see Table 1).

Table 1. *Some indicators depicting socio-economic variation in the selected regions from the three zones of Ghana. Source: ↑GLSS, 2017.*

Indicator / Region	Greater Accra	Ashanti	Northern
Persons aged 15 or older who have ever attended school	Male = 96.8% Female = 91.4%	Male = 94.2% Female = 82.6%	Male = 56.8% Female = 35.9%
Own at least one desktop, laptop, or tablet	14.6%	8.3%	2.1%
Have knowledge of ICT skills	37.9%	26.8%	5.6%

It is worth noting that the selected regions are the most populous in their respective zones and represent relatively homogeneous ethnic and tribal groupings. For each selected region, 2 districts (1 urban and 1 rural) were identified to enable an exploration of urban–rural dynamics. This means that a total of six districts comprising 3 urban and 3 rural districts were chosen for data gathering for this study. Furthermore, in each district, 3 communities — the district capital and two other communities — were randomly selected (see Table 2).

Table 2. *Selected study sites.*

Region	District	Communities
Greater Accra	La-Nkwatanang** Ada West*	Madina, Pantang, and Oyarifa Sege, Goi, and Toflokpo
Ashanti	Kumasi Metro** Sekyere Afram Plains*	Nhyiaeso, Buokrom, and Adoato-Adumanu Dagomba, Drobonso, and Issah Akura
Northern	Tamale Metro** Nanumba South*	Kukuo, Sakasaka, and Kakpayili Binda, Saba, and Wulensi

**urban district; *rural district

3.3 Research participants, sampling, and sample size

The research targeted relevant stakeholders at the national level, and those at the grassroots for whom these EdTech interventions were designed, to solicit their ideas and perceptions. The stakeholders included the MoE, Plan International, Mastercard Foundation, Lively Minds, head teachers, teachers at primary and JHS level, learners in school, learners with disabilities,[3] children

[3] The research excluded learners with hearing impairments due to communication challenges, and defined 'learners with disabilities' to include any learner in school with a physical disability.

not returning to school / out of school[4] and parents and some radio stations at district/community level.

Key stakeholders, such as the MoE, Mastercard Foundation and Plan International, were purposely targeted to gather deeper insights about GLTV and the GLRRP. At the district level, communities were selected from three (3) strata — the district capital, to the West of the district capital and to the East of the district capital — to cover a larger area and access a bigger number of diverse participants in the district. Teachers, learners, and children out of school were randomly sampled. Follow-ups were then made to interview some parents of learners and children out of school. The research targeted radio stations in the community that had one, and follow-ups were made to non-community-based radio stations that came up in the interviews. Table 3 presents the list of stakeholders interviewed and the justification for their inclusion in the study.

Table 3. *Stakeholders and justification for inclusion.*

Stakeholders	Reason for inclusion
National-level actors (MoE, Plan International, MasterCard Foundation)	Responsible for the implementation of the GLTV and GLRRP remote learning programmes. MoE coordinates the implementation of GLTV and GLRRP; Plan International supports the MoE in the implementation of GLTV; Mastercard partners with USAID in the implementation of the GLRRP.
Head teachers and teachers	Give perspective on EdTech use in schools / communities, its effectiveness in ensuring learning outcomes and inclusivity, and barriers.
Learners including the disabled	Share experience / benefits of GLTV and GLRRP EdTech interventions.
Out-of-school learners	Share reasons for not being in school, knowledge of EdTech interventions, ability to use and experience / benefits of GLTV and GLRRP EdTech interventions.
Parents	GLTV and GLRRP knowledge and awareness, supervision roles or support to children in developing self-learn autonomy and experiences.
Radio stations	Understand modes of transmission of GLRRP content, barriers and challenges related to access.

In each district, 3 head teachers (1 per community), 6 teachers (2 per community) and at 6 parents (2 per community) were interviewed; and focus group discussions were held with learners in school (one per community), with

[4] The research defined out-of-school children as including children who were unable to return to school after the Covid-19-related school closures and who had completed primary education but have not been able to continue secondary education.

learners with a disability (one per district), and children out of school (one per district). The total sample was made up of 145 (51%) males and 141 (49%) females. For adults interviewed, males constituted 56% and females were 44% but for children, the males were 47% and females were 53%. Table 4, below, gives the total sample per region and for the research.

Table 4. *Sample size distribution.*

Participants	Interview Type	Greater Accra	Ashanti	Northern	Total
Head teacher	KII	6	6	7	19
Teachers	KII	12	12	12	36
Learners in school (12–17 years old)	FGD	43	39	49	131
Learners with disabilities (12–17 years old)	FGD	4	8	7	19
Children out of school (12–17 years old)	FGD	6	7	6	19
Parents	IDI / FGD	16	19	22	57
Radio stations	IDI	1	1	2	4
Total		**88**	**92**	**105**	**285**

The sample size, though relatively small, is representative of the realities of learners and their families across the country, especially regarding how people responded to the school closures at the peak of the Covid-19 pandemic. It also fairly represents how the learners in public schools in both rural and urban areas accessed educational content delivered through radio and television during the lockdown. This is because the purely qualitative nature of the study makes it not so much dependent on the sample size, but the insights and narratives drawn from the different locations where the study was conducted. Again, the sample was carefully selected from the main geographic, ethnic, and economic clusters of Ghana, as well as rural and urban settings to capture as many varieties and nuances as possible in the responses.

3.4 Data analysis

The primary data gathered was analysed thematically, paying attention to the different groups of learners, gender dynamics and geographic contexts. Themes and sub-themes were generated from the transcripts produced after data collection. The transcripts were first grouped according to the various

geographical locations where data was collected. Codes were then generated from the transcripts and grouped under emerging themes and sub-themes using MAXQDA qualitative research analysis software. The following were the themes and sub-themes that emerged:

Table 5. *Themes and sub-themes.*

Themes	Sub-themes
Teaching and learning during and post school closures	■ Impact of Covid-19 and school closures on teaching and learning ■ Response to Covid-19 and school closures ■ Participation in remote teaching and learning ■ Current practices in school — use of remote learning after school reopenings
Assessment of GLTV and GLRRP	■ Reach, awareness, and knowledge of GLTV and GLRRP ■ Access, use and effectiveness of GLTV and GLRRP ■ Preferences, gaps, and ways to improve GLTV and GLRRP
Enhancing teaching and learning through EdTech	■ Government and stakeholder's intervention and roles ■ Caregivers' involvement, roles, and support ■ Teachers' involvement, roles, and support

Data triangulation was undertaken by comparing the data from the various geographical sources and participants and cross-referencing them with existing findings and literature. Percentages and counts were generated from the codes created under themes and sub-themes to quantify the findings.

3.5 Ethical considerations

At the start of every interview, the background and purpose of the study were explained to the research participants and informed consent was sought before interviews were conducted. For children, the consent of parents / caregivers was sought, and a second consent was sought from the children themselves before proceeding with the interviews. Participants were promised utmost confidentiality. Hence, the quotes used in the report are

anonymised to conceal the participants' identities. During our data collection, local dialects and English were combined to ensure that participants (especially children) fully understood the questions.

In addition, the national Covid-19 health and safety protocols were strictly adhered to. Face masks and hand sanitisers were made available, and the team ensured that both the interviewer and interviewee wore masks during the interviews and maintained a spacing of at least one metre from one another. The study also received full ethical clearance from PDA's Ethics Review Committee.

3.6 Challenges and limitations

The research was not without challenges or limitations. Table 6 presents the challenges faced and the mitigating approaches adopted to tackle the challenges. In terms of limitations, the GLRRP was designed for pupils from primary one to three, however, fewer learners and teachers in lower primary were engaged in this study due to the difficulties of interviewing students in this age group.

Table 6. *Challenges faced and mitigation approaches adopted.*

Challenges	Mitigating approach adopted
Permission from GES to conduct the interviews in schools was not granted due to Covid-19	The initial plan of targeting specific schools was changed. Hence, respondents were sampled from the community. This enabled access to varied respondents from many schools.
Availability of respondents at national and community level	Interviews were scheduled to suit the convenience of respondents by agreeing on time and place.
Covid-19	The research team adhered to the national Covid-19 health and safety protocols. This included the use of sanitisers, frequent hand-washing and wearing of face masks by both the interviewer and interviewee. Social distance was maintained.
Mobilisation of learners with disabilities in urban areas	Identifying and assembling learners with disabilities in urban areas was difficult as they were hard to locate. However, a snowballing technique was used to identify a few for interviews.
Planned interviews with some state and non-state actors were not successful	Some state and non-state actors agreed to be interviewed but were not available at the time of data collection. However, other relevant stakeholders were identified and interviewed.

4. Results

This section presents the analysis of the data under three thematic areas:

1. Teaching and learning during and post school closures.
2. Assessment of GLTV and the GLRRP.
3. Enhancing teaching and learning using EdTech.

4.1 Teaching and learning during and post school closures

This section of the report discusses teaching and learning during and after school closures. Table 7 highlights the findings.

Table 7. *Summary of findings on teaching and learning during and post school closures.*

THEME 1: TEACHING AND LEARNING DURING AND POST SCHOOL CLOSURES		
Findings	**Rural and urban comparison**	**Comment**
Lack of resources inhibited the facilitation of remote learning by schools and teachers	No difference was observed between rural and urban locations.	In-person teaching and learning did not happen because of the directives that schools should be closed and yet, resources for virtual and / or remote learning were not available in schools.
Use of virtual learning platforms — WhatsApp	WhatsApp was used by head teachers and teachers as a platform to deliver virtual lessons in 22% of urban and 11% of rural areas.	Irrespective of geographical location, WhatsApp groups were created for communication, sharing of questions and answers, and information relating to remote learning.
Learners were engaged through private tuition and self-driven learning during school closures	78% of learners in rural areas compared to 29% of learners in urban areas engaged in limited or no learning as they had to support caregivers in their work or help raise income for the home. This difference between rural and urban areas is significant.	Due to the lockdown, parents, and close relatives at home taught learners. Caregivers who could afford to do so hired private teachers. Learners were also encouraged to learn on their own when no private teacher or extra classes were provided. Some teachers also checked up on their students and encouraged them to learn.

Increased dropout rates and poor academic performance were the consequences of school closures	Seeking livelihood opportunities and teenage pregnancies resulted in an increased number of boys and girls dropping out of school. This was reported more in rural than in urban areas.	Long-term school closures affected children's ability to recall what was taught before the closures, thereby making learning difficult and resulting in poor academic performance. Children from affluent homes and those who took part in some form of learning during school closures were less affected by this phenomenon.
15% of head teachers and teachers interviewed indicated the use of a blended approach to teaching and learning after schools reopened	A minority of head teachers and teachers in both rural and urban areas indicated they combined in-person and remote learning in schools.	The initiative to blend remote learning with classroom activities was found to be school-specific and not all schools engaged in this approach once schools reopened.

In both rural and urban areas, schools were closed as directed by the government. The school closures and lockdown in response to the Covid-19 pandemic interrupted conventional schooling and resulted in Ghanaian teachers and school children losing out on structured in-person teaching and learning for 10 months.

When head teachers and teachers were asked about actions taken to ensure continued learning during the school closure, the narratives indicated that no in-person teaching and learning took place in schools. All head teachers and teachers interviewed in rural and urban areas indicated that they had to comply with government directives, and therefore did not engage in any active in-person teaching and learning in schools. Here are some quotes that support this finding.

> *"... We shut down. There was no teaching and learning. Individually we couldn't do much because of the directives given."* (Teacher, Ada West, Greater Accra Region.)

> *"... There was a break in teaching and learning. We had no option than to close the school as directed by the president and GES."* (Head teacher, Kumasi Metro, Ashanti Region.)

> *"... Teaching and learning came to a standstill. There was nothing we could do because we were all afraid of the Covid disease and government ordered that we close the school."* (Head teacher, Tamale Metro, Northern Region.)

During this period of school closures, head teachers and teachers indicated that they had to stay home with their families. Those head teachers and teachers who lived far from home returned to their homes until schools reopened. However, 20% of teachers and head teachers (21% in rural areas and 19% in urban areas) were in contact with their students and encouraged them to learn on their own at home.

Lack of resources inhibited the facilitation of remote teaching and learning

The most common response to school closures was to do nothing in relation to teaching and learning. More than two-thirds of the teachers interviewed did not engage in any form of virtual or remote teaching. This was attributed to the lack of necessary resources to facilitate remote teaching and learning. Some teachers in the Northern and Ashanti regions explained, respectively:

> *"... there are no such facilities and resources as computer lab, computers, smartphones, internet to aid this purpose."* (Head teacher, Nanumba South, Northern Region).

> *"We didn't because all the students do not have devices such as tablets and phones through which we can communicate with them, so we had to leave it as it is for them to be at home."* (Teacher, Sekyere Afram Plains, Ashanti Region.)

Notwithstanding the unavailability of resources to facilitate the shift to virtual teaching and learning, getting school children to sign up to the virtual platforms even if they were provided was difficult as most of them prioritised activities other than learning.

> *"... we don't have the needed materials to do that and, it would have been difficult to even get the children at home because they considered the closure of schools as an opportunity to do other things, like selling and all that so they hardly stayed at home. "* (*Head teacher, Kumasi Metro, Ashanti Region.*)

> *"They thought they had the freedom, so they weren't even staying at home for them to listen to it."* (Parent, Sekyere Afram Plains, Ashanti Region.)

WhatsApp was used as a platform to conduct some virtual lessons

About one-fifth of the head teachers and teachers interviewed indicated that they used WhatsApp chat and video calls to virtually engage their students in schoolwork to make up for the disruption in the school calendar and loss of

school contact hours. Individual teachers spurred the initiative to use WhatsApp as a platform for remote learning; this was not a school-organised activity. This was identified as being true in both rural and urban areas. In urban and rural areas respectively, 22% and 11% of teachers and head teachers indicated the use of WhatsApp for sharing teaching and learning materials with learners through parents' phones or provided telephone numbers.

> *"Yes, we used WhatsApp video calls and WhatsApp chats. We also recorded classroom sessions and sent them to the students via WhatsApp. We used these approaches because the students were at home for a long period of time, and we couldn't just sit aloof so we decided to communicate with them using this means."* (Head teacher, Ada West, Greater Accra Region.)

> *"... We employed the use of WhatsApp because, during the time, we were thinking that it would be for a short period of time but when it dragged on, we had to look at the convenience and other avenues that will be most helpful, such as watching televised lessons."* (Teacher, Tamale Metro, Northern Region.)

> *"... With the WhatsApp, we were able to get all the children on board. Even though the phones weren't theirs and they had to share it with their parents, elder brothers and sisters and relatives. They could always access these lessons anytime they had access to the phones."* (Teacher, Tamale Metro, Northern Region.)

Learners were engaged in schoolwork through private tuition, remote learning, and self-driven learning during school closures

Back home, parents and close relatives who were around spent some time teaching learners. Parents indicated that they had instructed their children to learn during school closures, and 82% of learners confirmed that they had spent some time learning while at home. For the remaining 18% of learners, 7% did nothing while 11% went into craftsmanship under apprentice agreements. Although these practices were mentioned in both rural and urban areas, significantly more children in rural areas (78% compared to 29% of learners in urban areas) had to support their parents in their work or help raise income for the home. This affected active participation in any form of learning activity. In relation to this, learners with physical disabilities had the opportunity to engage more in learning activities than other children, because of their disability. A key informant from Plan International confirmed this:

> *"Learners with physical disability took part in more learning activities (about 4–5 days a week) than other children who were engaged in house chores and other activities."* (Plan International)

Here are some responses from learners when asked what they did during the period of school closure.

> *"... I learnt on my own but not all the time. I learnt on the days I didn't go to the farm. Sometimes I went to farm throughout the week so it meant that for those weeks, I didn't learn anything."* (Learner in school, Ada West, Greater Accra Region.)

> *"... during school closure, we mostly helped our parents in the farm and sometimes we also had time to attend extra classes where we went to learn on our own."* (Learner in school, Nanumba South, Northern Region.)

> *"... I was selling."* (Learner in school, Sekyere Afram Plains, Ashanti Region.)

> *"I wasn't able to go to school but I had a private teacher, so Covid-19 didn't affect my ability to learn."* (Learner in school, La-Nkwatanang, Greater Accra Region.)

4.1.1 Consequences of school closures

While school closures may have been necessary to control the spread of Covid-19, their impact on the well-being and performance of school children cannot be understated. Not only were learning and performance affected, but children were exposed to exploitation, particularly young girls. School closures led to a reported increase in teenage pregnancies, which resulted in dropouts.

Learning has become difficult, resulting in low academic performance

In rural and urban areas, head teachers, teachers, and learners in schools indicated that learning has become difficult resulting in poor academic performance. Respondents mentioned, among other reasons, that long-term school closure mainly affected the children's ability to recall what was taught before the closure, made learning difficult and generally reduced academic performance. The concerns of some respondents who alluded to this situation are captured in the following quotes.

> *"... when the students came back from the break it was as if they had never been to school before. They had forgotten everything we taught them."* (Teacher, Ada West, Greater Accra Region.)

> *"It has reduced the effort I put into learning because I wasn't going to school again. I was not getting face-to-face lessons from my teachers so my level of understanding of the topics that I learnt had reduced."* (Learner in school, Ada West, Greater Accra Region.)

> *"The closure of schools has really affected learners because they forgot all we had already taught them, making it difficult for us to start treating new topics."* (Head teacher, Kumasi Metro, Ashanti Region.)

Increased dropout rate

Long-term school closures negatively impacted school continuity. Ensuring that learners return to school after the closure has become a challenge. The interests and priorities of some learners were diverted by other engagements during the long 'vacation'. While some were involved in small-scale trading to support their families because of the interrupted flow of income, others went into apprenticeships and some got lured into sex for money, which often resulted in teenage pregnancies. Aside from these reasons, some parents were sceptical about the safety of their children; hence they either prevented them from returning to school or allowed them to return only sometime later after reopening. The following narratives suggest some of these difficulties in getting children back to school after a long-term closure.

> *"My mother was encouraging me to learn but when she realised I had lost interest in school she encouraged me to learn the air condition repairing job (become an apprentice) and bought my tools for me."* (Learner, out of school, La-Nkwatanang, Greater Accra Region.)

> *"Because of Covid-19, one of my colleagues doesn't come to school again and he is in the community selling water."* (Learner in school, Tamale Metro, Northern Region.)

> *"Teaching and learning became very difficult because parents were scared to allow their children to come to school. It took a while for the parents to finally allow their children to come to school."* (Head teacher, Kumasi Metro, Ashanti Region.)

> *"Some of the school children also got pregnant while others indulged themselves in various social vices like drug abuse."* (Teacher, Ada West, Greater Accra Region.)

4.1.2 Adoption of remote learning after school reopening

After schools reopened, some schools combined face-to-face teaching and learning with remote learning. Although teaching and learning were halted by the school closures, the reopening of schools has seen some head teachers and teachers adopting a blended teaching and learning approach by combining traditional in-person classroom teaching and learning with remote learning. Approximately 15% (21% in rural areas, 7% in urban areas) of head teachers and teachers interviewed indicated that they encourage their students to take part in remote learning programmes, specifically GLTV and the GLRRP, and assess learners on the various lessons taught remotely. According to one head teacher, the time at which the English lesson is broadcast through the GLRRP has been incorporated into the relevant class timetable, and during such periods the radio and activity books are used for teaching and learning. Here are some quotes to buttress the finding.

> *"When the pandemic started, schools were closed and because schools were closed, government had to put plans in place to replace the contact hours break between teachers and students so there was the need for distance learning, which most people had been crying [for] for a very long time, even when school was in session. So it has given us the opportunity to try something. So even though school is in session now some of us still like to use the distance approach to reach our students and I think that is a positive impact."* (Head teacher, Ada West, Greater Accra Region.)

> *"We have two radios in the school and time has been allocated on the timetable delivering the content of the radio programme. The programme is played around 9–10 am or 11 am with guidance from teachers."* (Teacher, Kumasi Metro, Ashanti Region.)

> *"... the school is promoting the use of the GLTV and GLRRP; we have added lessons from the GLTV to the school's timetable."* (Teacher, Kumasi Metro, Ashanti Region.)

Other quotes reveal the adoption of GLTV and the GLRRP into the usual classroom activities as a result of teachers identifying benefits from their perspective.

> *"Our school is promoting the use of the GLTV by making announcements about it for about three times a day and we ask the children to tell us what they learnt from watching the programme. Especially with the lower primary, we have the Bluetooth radio that has a pen drive slot for the school. We have the soft copies of the programme on a pen drive, so when it is time, we play it for the children, and we guide them. We do it during school hours, especially when they are teaching English language."* (Head teacher, Kumasi Metro, Ashanti Region.)

> *"... yes, the school is promoting the use of the GLTV and GLRRP, we have added lessons from the GLTV to the school's timetable."* (Teacher, Kumasi Metro, Ashanti Region.)

4.2 GLTV and GLRRP

This theme focuses on GLTV and GLRRP remote learning programmes. Three sub-themes are discussed:

1. Reach, awareness, and knowledge.
2. Access, use and effectiveness.
3. Preferences, gaps, and options for improvement.

Table 8, below gives a snapshot of the key findings.

Table 8. *Summary of findings on the assessment of GLTV and GLRRP.*

THEME 2: ASSESSMENT OF GLTV AND GLRRP		
Findings	**Rural and urban comparison**	**Comment**
The use of radio and television as broadcasting technologies for remote learning has wide reach and coverage.	In both rural and urban areas, GLTV and the GLRRP had high coverage or reach. However, the transmission signal of the radio and television programmes was stronger in urban areas than in rural areas.	The unavailability of radio stations in some rural areas made it difficult to access the GLRRP in those areas due to poor radio signals.
Accessing the GLTV and GLRRP remote learning programmes was hindered by a lack of awareness and knowledge about the programmes and a lack of access to required resources, like television and radio.	Knowledge and awareness about GLTV and GLRRP were relatively high in urban areas compared to rural areas. Also, 20% of caregivers in rural areas compared to 4% in urban areas had neither television nor radio at home.	Support from Plan International increased access among marginalised groups. Also, sharing of GLRRP content on pendrives by GES for broadcasting at places of worship (mosques) in the northern belt (both rural and urban) increased access although the practice was not sustained for a long time.
Despite access challenges, those who participated in GLTV and GLRRP programmes gave testimonies reflecting a positive impact on their academic performance and professional development.	Positive impact was reported by learners in rural and urban areas. No geographical variation was observed.	GLTV and the GLRRP were stated to be beneficial to learners as well as teachers.
A myriad of challenges impedes effective participation in remote learning through GLTV and GLRRP. This includes distractions during programme telecast, airing time of the programme for various classes, and difficulty in understanding some lessons.	Challenges identified to hinder effective participation in remote learning were similar in rural and urban homes.	Effective participation in GLTV and the GLRRP was hindered by some existing circumstances at home as well as by programmatic factors.
Access and participation in GLTV and GLRRP could be improved by incorporating them into main school activities, telecasting lessons on multiple platforms, adding phone-in sessions, or creating call centres, among other suggestions. Creating awareness and sensitisation would improve access and participation in the GLTV and GLRRP remote learning programmes.	These suggestions were similar in both rural and urban areas.	GLTV and the GLRRP, although beneficial, can be improved to increase accessibility and effective participation.

4.2.1 Reach, awareness, and knowledge

GLTV had more coverage than the GLRRP because of the content produced and the broadcasting infrastructure

GLTV targets a wider variety of users than the GLRRP. The former delivers content on four core subject areas for users from primary one to the end of secondary school, whereas the latter targets users from primary one to three and the content delivered is limited to reading and good behavioural practices. The content of GLTV is transmitted nationwide through a single source of transmission (via the GBC) whereas the GLRRP requires transmission from various radio stations within a geographical area. Consequently, the non-availability of radio stations in some areas limited the reach and coverage of the GLRRP. The wide coverage of GLTV could also be explained by the fact that, ordinarily, in many homes, decoders and antennas are installed to have access to multiple television channels with good picture quality, and these devices are needed to access the GLTV programme. Particularly in the rural areas where the GLRRP was mostly used, the reach was dependent on the availability of a local radio station in the district or community to broadcast the programme. The separate negotiations that had to be made with each local radio station compounded the challenge. Therefore, the reach of the GLRRP was small in rural areas where there was no radio station broadcasting the GLRRP lessons or where contracts were not successfully secured with existing local radio stations.

> *"The signal around this part of the country was not very good as some of the students could not tune in to benefit from it."* (Head teacher, Sekyere Afram Plains, Ashanti Region.)

> *"With the GLRRP, I don't have access to radio signals in the community."* (Learner in school, Nanumba South, Northern Region.)

Approximately 59% of the respondents had some knowledge of GLTV or the GLRRP

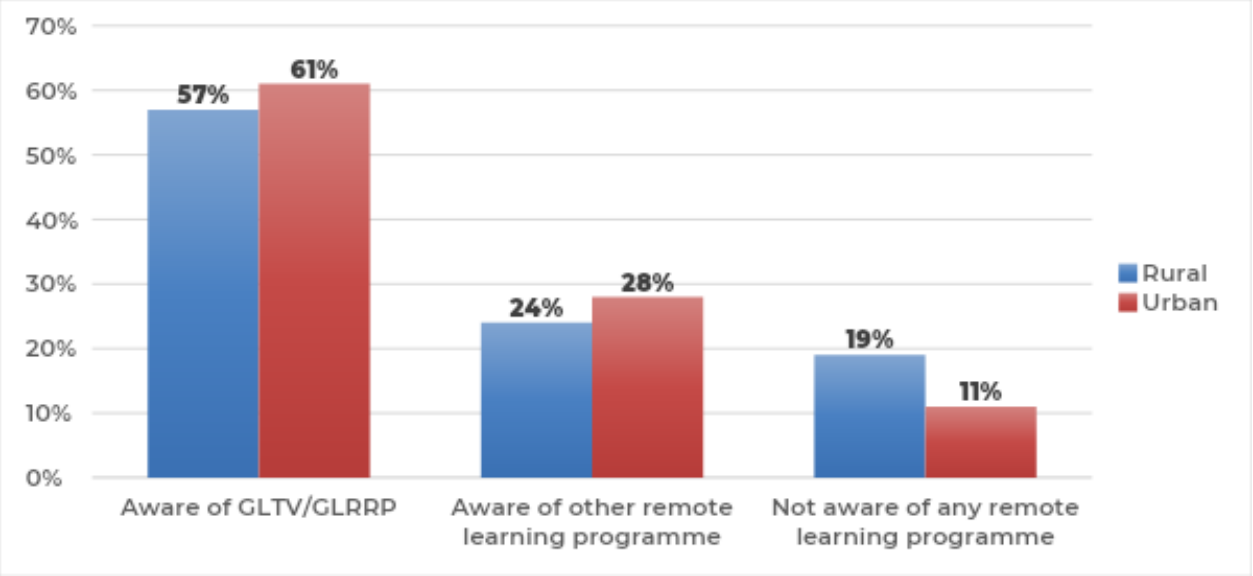
It was found that 57% and 61% of the respondents in rural and urban areas respectively knew of at least one of these distance learning programmes; 26% of the respondents knew about other distance learning programmes, like Joy Learning, while 15% had no knowledge of existing remote learning platforms (see Figure 3). Therefore, for every 10 respondents, 4 were neither aware nor had any knowledge of GLTV and GLRRP remote learning platforms.[5] These

[5] It is important to note that knowing about GLTV and GLRRP does not imply access or use of the programme. Although many indicated awareness of the GLTV and GLRRP remote learning programmes, about half indicated they had not tuned in to watch or listen to any of the lessons.

included head teachers, teachers, parents, and learners. Some quotes indicating a lack of awareness and knowledge about distance learning programmes are given below.

> *"I do not know of any TV or radio learning programme."* (Learner in school, Kumasi Metro, Ashanti Region.)
>
> *"No, I don't know about the GLTV or GLRRP."* (Teacher, Tamale Metro, Northern Region.)
>
> *"The television I have in my house, I bought it for the family. If I knew the children could learn through the TV and radio, I would have always forced them to sit and watch."* (Parent, Tamale Metro, Northern Region.)

Figure 3. *Knowledge and awareness of remote learning programmes. Source: Authors' calculations using MAXQDA.*



4.2.2 Access, use, and effectiveness

GLTV was accessed more in both urban and rural areas than the GLRRP

Ability to access the GLTV and GLRRP lessons hinged on the ownership or availability of a digital or an analogue television with a decoder and / or a radio. Of the caregivers interviewed (guardians form approximately 45% of learners who participated in this research) only 12% (20% in rural areas and 4% in urban areas) indicated not having either television or radio at home. Although not all the study samples confirmed access, because some respondents did not know about these remote learning programmes, both GLTV and the GLRRP were accessible in rural and urban areas. This is because television and radio serve as common sources of information and entertainment for households in

both rural and urban areas. Approximately 39% of learners (52% in urban areas and 27% in rural areas) indicated they had partaken in lessons delivered through GLTV and GLRRP.[6] However, some of the learners indicated accessing other remote learning programmes.

> *"In terms of access, you know this place is a remote area so not all parents have television so their wards can watch. So, it was limited by the lack of television and radio for the children to learn. Although Plan Ghana came to our aid by sharing television for the children, but it is limited to only girls and children with disabilities."* (Parent, Ada West, Greater Accra Region.)

Although the GLRRP was designed to suit a specific geographical context (using local languages in specific areas for content delivery), there was no evidence in our data that suggested it was accessed more in rural areas compared to GLTV. This may be due to the following limitation in our study: while the GLRRP targeted learners in primary one to three, most of the head teachers and teachers we interacted with were supervising higher classes (classes beyond primary three) and two-thirds of the learners we interviewed were in upper primary and junior high classes.

Respondents alluded to the infrastructural deficit in rural areas as constricting access for children. They indicated that lack of infrastructure, such as electricity, non-availability of radio stations, and inability to afford remote learning devices such as radio and television, inhibited access. Here are some quotes.

> *"... most of the communities don't have access to these platforms even if they are available. Until recently, we (Nanumba South) also did not have any access to radio signals to rely on."* (Head teacher, Nanumba South, Northern Region.)

> *"I didn't have radio and television at home, that was why I didn't use any of these platforms."* (Learner in school, Sekyere Afram Plains, Ashanti Region.)

GLRRP content was played at the mosques and a football park to increase access.

Due to the infrastructure deficit, particularly of radio stations, and limited or no access to radio, the study found that in Nanumba South and Tamale Metro the GLRRP content was played at the mosques, which was identified by head teachers as an advantageous place to broadcast the lessons due to the influence of Islam in the areas. This initiative did not last, however, as there

[6] The GLTV and GLRRP were not accessed by learners in Sekyere Afram Plain and only two learners indicated access in Nanumba South while 14 accessed the remote learning programme in Ada West.

were no teachers at the mosques to guide learners, there was poor parental cooperation, and the playing of GLRRP content in mosques nearly resulted in religious misunderstandings in some cases, specifically in Nanumba South.

> *"Those in the villages are not able to participate in remote learning because some of them don't even have access to electricity. Even though GES provided some resources on a pen drive to be used, they played it in some mosques, and it nearly generated religious problems in some sections of the community."* (Head teacher, Nanumba South, Northern Region.)

> *"... at some point, the Ghana Education Service loaded some of the lessons on pen drives and asked that we play it at vantage places for the children to listen to. In the town, three vantage points were identified and played. But the lack of cooperation of parents did not allow it to last."* (Head teacher, Nanumba South, Northern Region.)

> *"... I remember we were called and given some books for our younger children to learn by listening to the audio that was played at the mosque. They never learned anything because only a few of them went there and even there was no one to guide them in what to learn so they only went to make noise and come back home."* (Parent, Nanumba South, Northern Region.)

Such efforts to establish collective learning were also recounted in the south. From the accounts of one head teacher in Ada West, knowing that some children would not have access to radios at home to benefit from the GLRRP distance learning programme, the school requested and received two radio sets from the 'Assemblyman'[7] in the area to help learners. The radio sets were played from the school park, promoting co-listening, and teachers were around to help learners who left their homes to take part in the broadcast lessons.

Initiatives from Plan International improved access to GLTV among the marginalised in Ada West

The study found that the provision by Plan International of television sets to marginalised groups enabled them to access the GLTV lessons, which ordinarily would not have been possible. Again, the Making Ghanaian Girls Great project implemented by Plan International, which saw the installation of solar-powered and satellite-enabled distance learning infrastructure in rural communities to deliver interactive learning sessions to students, teachers, and communities, helped to increase access in the project communities, Ada West included. Some quotes to support this finding included the following.

> *"... The degree of access / participation in the TV lessons in our project communities was around 30% and we managed to increase it to almost*

[7] The Assembly person is the political (elected) representative for a group of people in an electoral area within the local government system in Ghana.

> *70% after three months, thanks to the distribution of TVs and decoders."* (Plan International.)
>
> *"... Plan International gave some persons with disabilities, including my child, television set to support their learning during the lockdown."* (Parent, Ada West, Greater Accra Region.)

Although attempts were made to broaden access to remote learning programmes in rural and urban areas, by introducing the GLRRP, distributing workbooks to help learners, and placing the GLRRP content on pen drives for distribution to schools and places of worship for broadcasting for the benefit of those without a radio, access was still a challenge due to limited knowledge and awareness. Some parents failed to visit schools to collect the workbooks, give the necessary support to their children (such as allowing them to watch television or listen to the radio) or supervise them to aid learning.

> *"Some parents, after successfully receiving the workbooks, were not following the programs with their children."* (Head teacher, Tamale Metro, Northern Region.)
>
> *"The activity books were given to them (learners) but the availability of technology devices like TV and radio and accessibility is a problem."* (Head teacher, Nanumba South, Northern Region.)

A further challenge faced by children from poorer households was the lack of time and opportunity to partake in the lessons as they had to assist their parents / guardians with their work. This did not vary with gender; both male and female learners stated that they were unable to participate in distance learning programmes because of chores.

> *"I would have to help with house chores, so I barely get time to participate in a remote learning programme."* (Learner, Kumasi Metro, Ashanti Region.)
>
> *"... sometimes we as girls don't have time to watch television because of the workload from house chores."* (Learner, Nanumba South, Northern Region.)

In relation to the use and effectiveness of GLTV and GLRRP remote learning programmes, respondents who had access said they were useful and beneficial in many instances. The usefulness, benefits, and effectiveness are discussed below.

GLTV and the GLRRP have built the capacity of head teachers, teachers, and parents

It was found that some parents, teachers, and head teachers watched or listened to the distance learning programmes themselves to revise things they had learnt, acquaint themselves with teaching pedagogies, and identify appropriate teaching materials to enhance their service delivery. Thus, GLTV

and the GLRRP can also support the professional development of teachers, especially in areas where access to teaching and learning materials is limited. Hence, head teachers and teachers revealed that they encouraged their colleagues to participate in the distance learning programmes and promote the use of blended, in-person, and remote learning approaches in schools. The following quotes indicate how GLTV and GLRRP built the capacity of parents and teachers.

> *"I tuned to the Ghana learning channel on multi-TV decoder and they were teaching mathematics, which I thought was something very good. In fact, myself, even though I am no longer a student, I really enjoyed it because I was still learning some things I did not know. As for the radio one, I was privileged to get some of the recorded programme from a colleague who is a head teacher and so once in a while I even play it on my phone for my child to listen."* (Parent, Nanumba South, Northern Region.)

> *"I tuned in to watch several times myself. I did because I wanted to ascertain its effectiveness and then advise my students to also tune in to watch. So, I watched the pre-school, I watched the primary, the JHS and even the SHS and I realised it was good, so I started encouraging my students to also watch. I even call one or two students when the programme is being aired to find out whether they are watching."* (Head teacher, Ada West, Greater Accra Region.)

> *I have been watching it. There are some subjects that we at the rural areas do not get enough materials on, like science and mathematics, and also how to effectively teach them. So, when you go home and there is something like that then you can watch and learn from it. (Teacher, Sekyere Afram Plains, Ashanti Region)*

GLTV and GLRRP have positively impacted academic performance

Parents, teachers, and head teachers indicated that GLTV and the GLRRP have been generally beneficial and effective because those who were able to access the lessons were learning new things. As a result, the academic performance of those who accessed the GLTV and GLRRP remote learning programmes was better than that of learners who did not take part in the remote learning.

> *"It has impacted positively on the lives of children. The learning levels of children have improved over time. Obviously, they have learnt new things."* (Teacher, Tamale Metro, Northern Region.)

> *"Can you believe that primary 3 children are better than primary 4 in terms of reading because of the learning programme?"* (Teacher, Tamale Metro, Northern Region.)

The difference in academic performance between learners who took part in remote learning using GLTV and GLRRP is also captured in the following quotes.

> *"Yes, there are some differences, and this was confirmed by the parents when we had our parents–teachers association meeting. My colleague teachers whose subjects are being taught on the television programme also confirmed that those who took the lessons seriously are performing better in class than the others."* (Teacher, Ada West, Greater Accra Region.)

> *"It has impacted them because some of the things that they learnt has now become a revision to them now that we are teaching them, and they know ahead of their colleagues who didn't participate in the programme. So, learning becomes easy for them."* (Head teacher, Sekyere Afram Plains, Ashanti Region.)

> *"Those who participated have improved academically as compared to those who did not participate fully in the programme. I took notice of this as soon as they resumed, and we began conducting tests."* (Teacher, Tamale Metro, Northern Region.)

Interviewed learners affirmed the views of head teachers, teachers, and parents, indicating that GLTV and the GLRRP had been beneficial and effective. This increased the willingness and interest of other learners to participate.

> *"I learn new things. I hear and see things for the first time in my life."* (Out-of-school learner, Ada West, Greater Accra Region.)

> *"I was able to recollect all things we were taught in class but had forgotten."* (Learner with disability, Ada West, Greater Accra Region.)

> *"It makes me learn ahead of time and I am always ahead of my mates so when my teacher asks me questions concerning the topics, I had already learnt on the learning platform, so I answer it easily."* (Learner in school, La-Nkwatanang, Greater Accra Region.)

GLTV and the GLRRP replaced the need for private teachers, thereby reducing the educational cost burden on parents

Some parents indicated that they no longer had to hire the services of a private teacher for their children. Rather, they supported their children with the necessary learning materials and encouraged them to learn through GLTV and the GLRRP. This was beneficial to parents as their cost burden was lessened.

> *"It has been beneficial to me as it prevented me from having to spend money to get a private teacher to assist them during the closure of schools and the children are performing well in school now."* (Parent, Kumasi Metro, Ashanti Region.)

> *"Some parents will also be spared the cost of buying books because some of the children are still using the workbook that was provided for remote learning."* (Head teacher, Tamale Metro, Northern Region.)

GLTV and the GLRRP enabled learners with physical disabilities to benefit more from teaching and learning than going to school

The perception of learners with disabilities, parents, teachers, and head teachers indicated that learners with disabilities benefited more from the remote learning, provided they had the required resources (as in the case where marginalised groups in rural areas were supported with television sets). However, they mentioned that disability exists in many forms and supervision may still be required. Here are views expressed by some respondents.

> *"You don't have to walk somewhere to be able to access it. All you need to do is to sit where you are and get an ICT tool to watch so I don't think a disabled child would be disadvantaged. The radio is there for those who are blind, and the sign language on GLTV is there for those who are deaf."* (Head teacher, Ada West, Greater Accra Region.)

> *"To a larger extent the programme met the needs of children with disability because depending on the type of disability, the child can either participate in the radio or television programme."* (Parent, Kumasi Metro, Ashanti Region.)

> *"Yes, because my child, for instance, makes him very attentive. So anytime he does that, I presume he was getting what is being taught."* (Parent of a learner with disability, Kumasi Metro, Ashanti Region.)

> *"Some children are shy of their condition and feel uncomfortable mingling with friends probably because they think they will laugh at them, but since they are home with only their parents, they can concentrate well and care less about who will mock them."* (Parent of out-of-school child, La-Nkwatanang, Greater Accra Region.)

> *"I was learning some things that we were not taught in class."* (Learner with disability, Ada West, Greater Accra Region.)

GLTV and the GLRRP encouraged guided learning and self-driven learning

Learners disclosed that when it came to assessing what was learnt, the answers to questions displayed during GLTV lessons enabled them to evaluate whether they had understood the lesson. Others also mentioned that through peer learning, asking close relations (parents, siblings) to check what they had done and consulting their textbooks gave them a sense of their understanding.

> *"I answer the questions that are always asked during teaching. I am able to answer most of the questions that are asked in class because I learn those topics on the television."* (Learner in school, Ada West, Greater Accra Region.)

> *"I solve the questions with them and compare my answer to theirs. I was able to get the first position in class because of this distance learning."* (Learner in school, La-Nkwatanang, Greater Accra Region.)

> *"For instance, normally when they are teaching you, they will normally give questions for the viewers to answer and after some time the right answers are given out. That to me is a way of assessing whatever that I was doing."* (Learner in school, Tamale Metro, Northern Region.)

Learners acknowledged that some caregivers, teachers, and head teachers provided support, which ranged from learning resources — including pens, exercise books, tables, and chairs — to words of encouragement and motivation, to direct supervision to aid the use of and get the most out of distance learning programmes on television and radio. Also, the provision of television sets by Plan International to learners with disabilities and to vulnerable girls, in places like Ada West district and others, was noted by respondents as helpful and increased access to distance learning programmes among the marginalised in rural areas.

> *"I allow them to watch the learning television. I bought books to encourage them. I always advise them to take their studies very seriously."* (Parent, Ada West, Greater Accra Region.)

> *"My mother stopped me from doing house chores at the time when it was time to learn."* (Learner in school, Kumasi Metro, Ashanti Region.)

> *"At times my mother joined us and we all learned together. We were reciting what we have learnt together to ensure that what I am learning sticks."* (Learner with disability, Kumasi Metro, Ashanti Region.)

4.2.3 Preferences, gaps, and options for improvement

Televised remote learning was preferred over radio broadcasting due to the audio-visual nature of television

Among the participants who were familiar with GLTV, GLRRP and other distance learning programmes, 82% indicated a preference for TV-based remote learning programmes over radio because of TV's audio-visual aspects. The audio-visuals enabled learners and viewers to see and hear what was being taught. This made learning a subject like mathematics easy from the perspective of the respondents. Some quotes from the interviews that reflect these views included.

> *"The TV programme was preferred because of the visuals. Even if you cannot see, you can hear what they are teaching but for the radio programme, if you cannot hear, there is no way you will benefit. Also, for the TV programme, those who cannot hear are assisted with sign language interpreters to explain what is being said to them."* (Teacher, Sekyere Afram Plains, Ashanti Region.)

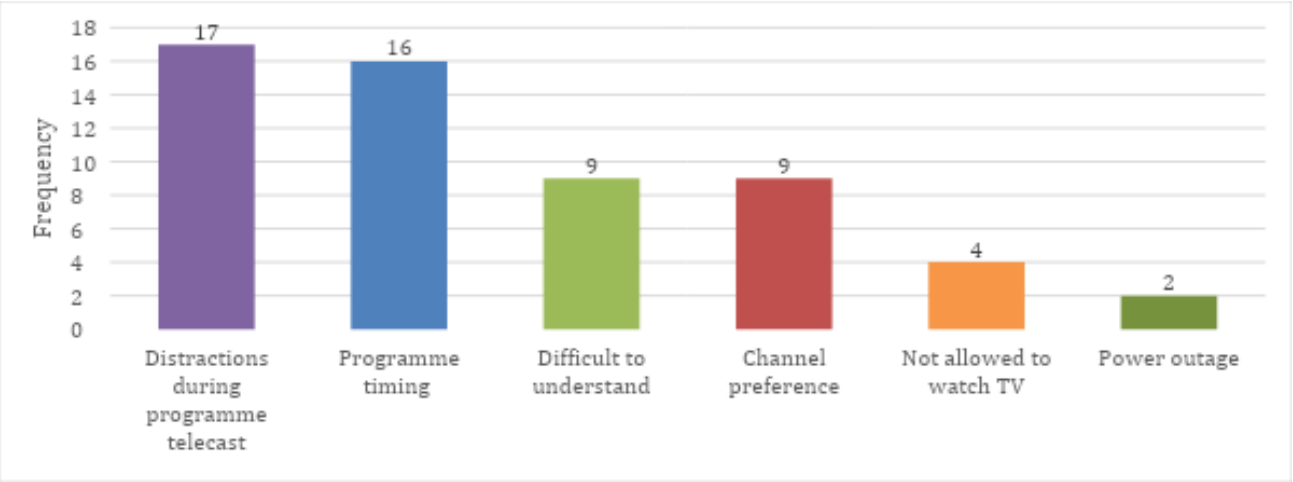
> *"The television programme is preferred because the children can see the one teaching but with the radio, it's just oral and it would become*

> *difficult for the children to learn with it."* (Parent, Kumasi Metro, Ashanti Region.)
>
> *"Though I liked the radio because it was more interesting than the TV. But I prefer watching television. I saw pictures and how things were done."* (Learner in school, Nanumba South, Northern Region.)

The remaining 18% indicated a preference for the GLRRP over GLTV. From their viewpoint, especially in rural areas, many homes do not have the financial resources to afford a television or the physical infrastructure, such as electricity, to access GLTV. In addition, radio is relatively cheaper than television and can be accessed from mobile phones including non-smartphones

Although GLTV and the GLRRP were identified as effective distance learning programmes, some challenges associated with the use of these distance learning programmes were raised (see Figure 4, below).

Figure 4. *Challenges with remote learning. Source: Author's calculations using MaxQDA.*



The analysis shows that the number one challenge was distraction during the programme telecast

Learners were asked to run errands or carry out chores during the lesson, which meant that they missed the programme or were unable to follow the lesson fully for a better understanding of what was being taught.

> *"... selling fish for my grandmother — as a result, I don't make time to watch the programme. Sometimes too when I am watching my grandmother will be sending me to buy things for her, so I don't get full concentration. Sometimes, too, my aunty doesn't allow me to watch the learning programmes when she is smoking fish. She wants me to be by her so she can send me to run errands for her."* (Learner in school, Ada West, Greater Accra Region)

> *"When it's time for those programmes we may be engaged in house chores like washing of bowls, sweeping or taking care of our younger siblings."* (Learner in school, Nanumba South, Northern Region).

> *"... sometimes due to house chores I get so tired that I'm unable to watch and learn as I wish. Sometimes I go to the farm with my parents, which makes me miss lessons for my class when showed."* (Learner with disability, Ada West, Greater Accra)

The second challenge is programme timing

From the perspective of parents, during the times that the programmes are being aired, they are mostly not available to supervise their children. In addition, parents and learners shared that because all the subjects are run one after the other on one channel, learners had to wait till their class lesson was being telecast and many times they missed it, partly because they didn't know what time it started or didn't have the timetable for the various lessons.

> *"Because of the timing of the programmes, we as parents are not able to monitor them to know whether they actually watch the GLTV and GLRRP. They are shown at a time we as parents are already on the farm and so cannot do the required monitoring."* (Parent, Nanumba South, Northern Region.)

> *"The time for the radio programme was not suitable, any working parent will not be available to help the ward. They complained about it a lot. So many children didn't participate."* (Teacher, Tamale Metro, Northern Region.)

> *"... because it is just one channel, many subjects are taught on the same platform at different times. This I feel is not nice because some learners will idle for long before the lessons reach their turn and sometimes, they may not even know the time for the next subject. I think many people did not also know about it as I know a friend who only got to hear of it after I chanced on it on TV and informed him."* (Parent, Tamale Metro, Northern Region.)

Difficulty understanding the lessons was the third-highest barrier

The level of difficulty of the content and the use of English were mentioned as barriers. This was expressed in several quotes.

> *"... sometimes when they are teaching, I don't understand so I change the channel to TV7 to watch wrestling."* (Learner in school, Ada West, Greater Accra.)

> *"... sometimes understanding what was being taught was very difficult for me so it made me less interested in the platforms."* (Learner, Kumasi Metro.)

> *"The programme is in English and I sometimes don't understand some of the things they say."* (Out-of-school learner, Ada West, Greater Accra Region.)

Battle with siblings or caregivers over which channel and programme to watch was the fourth-highest challenge

> *"... because my dad also watches the TV sometimes and so when he is watching his programme, I am not able to access the learning channels."* (Learner in school, La-Nkwatanang, Greater Accra Region.)

> *"... my younger sibling fights with me over the remote for her to watch her favourite channel too."* (Learner in school, Ada West, Greater Accra Region.)

Learners not being allowed to watch television and power outages were other challenges identified by respondents as preventing effective participation in distance learning programmes such as GLTV.

> *"... we have television, but we do not have electricity, as a result, I couldn't use any of the learning platforms."* (Learner with disability, Ada West, Greater Accra Region.)

> *"... my parents do not allow us to watch television often and that's a challenge. My family runs a water supply business and so often times we are attending to the customers when we are home and that's why we don't get to watch the learning programmes."* (Learner in school, La-Nkwatanang, Greater Accra Region.)

> *"My parents do not allow me to use the television or radio."* (Learner in school, La-Nkwatanang, Greater Accra.)

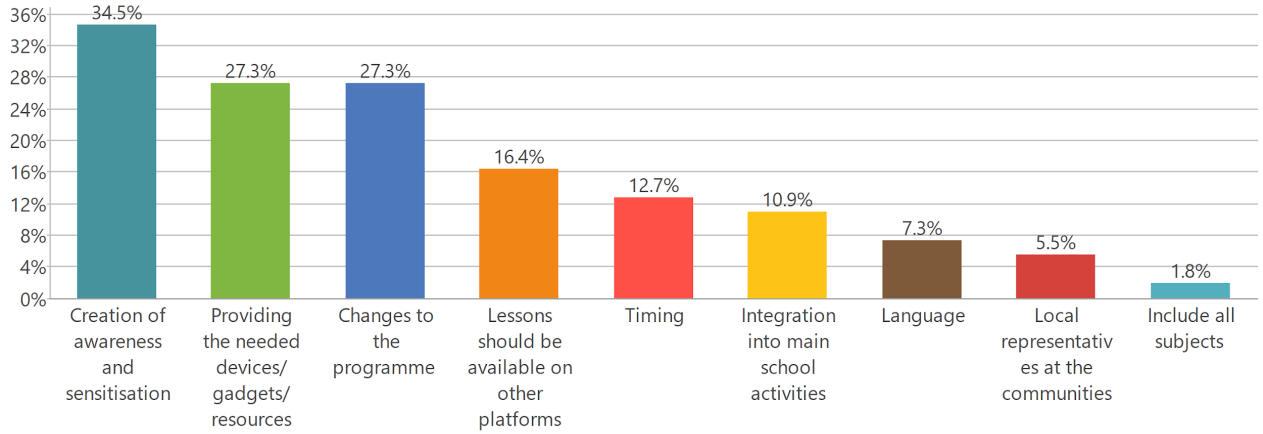
> *"Power outages affect us because we are not able to watch TV and currently that problem is with us."* (Learner in school, Tamale Metro, Northern Region.)

For children with disabilities, the general consensus from the analysis of the data is that GLTV and the GLRRP can be beneficial and promote inclusivity if the required resources are provided. Learners with hearing impairment benefit from the signing used during the GLTV telecast, while learners with visual impairment could benefit from the GLRRP. However, learning materials, such as braille for the visually impaired, and television and radio for the disabled who cannot afford them, is needed. Learners with disabilities are identified as people with special needs, and the respondents believe that distance learning programmes such as the GLRRP and GLTV alone would not be enough, as they would still need some in-person support.

Options for Improvement

Figure 5, below, shows the suggestions gathered from participants on how GLTV and the GLRRP could be improved.

Figure 5. *Percentages of suggestions for improvement to GLTV and GLRRP. Source: Author's design using MAXQDA.*



Participants believe that there is a need for awareness creation and sensitisation of the public

This is especially important for parents, to enable them to support and encourage their children to partake in these distance learning programmes, for example, by not sending them on errands or giving them chores to do when it is time for lessons.

> *"Training should be provided for parents so that they won't be sending their children when they are watching educational programmes. Some parents don't know much about the educational programmes that are being run on the television. They think the children are watching movies, so they don't give them chance to concentrate more to benefit fully."* (Parent, Ada West, Greater Accra Region.)

> *"There was no advertisement even though they mentioned during the training that they were going to advertise for about a week. More publicity needs to be done about it. I think about a week of thorough advertisement using even other stations would really increase the listenership."* (Teacher/GLRRP Voice Actor, Tamale Metro, Northern Region.)

Some respondents — largely learners — indicated that *teachers should teach at a slower pace, lessons should be interactive and repeated, and phone-ins should be introduced* to accommodate slow learners and ensure that viewers understood the lessons.

> *"... they should keep the programme running and relax a bit when they are teaching. Some of the teachers are too fast. Also, they have to show us how*

> *to solve the problems on the board, not just projecting the answers."* (Learner in school, Ada West, Greater Accra Region.)
>
> *"The GLTV should drop a WhatsApp number or another online platform so that questions, answers and suggestions can be sent before, during and after lessons." (Learner in school, Tamale Metro, Northern Region.)*

GLTV and GLRRP should be aired or telecast on other channels

There was also a suggestion that both the GLTV and GLRRP programmes be aired or telecast on other channels to enhance access and participation, as not everyone could afford a decoder such as multi-TV or access to some radio stations. Whereas some respondents indicated that the time allocated for each lesson should be increased and the time structure for telecasting lessons be revised to prevent learners from being glued to the television all day waiting to watch their lesson, others revealed that the language used for teaching lessons on GLTV (English) be changed or blended with local dialects to help children with understanding the lessons, as not all learners, especially those in rural areas, understand English fluently. Regarding this suggestion, it is worth noting that deciding on a local dialect would be difficult as many local languages are spoken in Ghana. Also, producing television lessons in multiple languages would be costly. Hence the need to make use of GLRRP, which has content delivered in local languages. From the viewpoint of a learner:

> *"The lesson should be done in our local language and English so that we can understand it well."* (Learner in school, Nanumba South, Northern Region.)

Respondents also indicated that integrating GLTV and the GLRRP into main school activities once schools reopened would be helpful and that community representatives should be trained as supervisors and as the go-to persons when learners have difficulty with any lesson. Including all school subjects in the distance learning programmes, especially GLTV, so as to enhance them, was the final suggestion made by our respondents.

4.3 Enhancing teaching and learning through EdTech

The study found that enhancing teaching and learning through EdTech requires coordination and collaboration among various stakeholders, who include the government, teachers, parents, and the community. This finding is expanded in the following subsections.

Table 9. *Summary of findings on enhancing teaching and learning through EdTech.*

THEME 3: ENHANCING TEACHING AND LEARNING THROUGH EDTECH		
Findings	**Rural and urban comparison**	**Comment**
Lack of awareness and knowledge about EdTech programmes limit its effectiveness for teaching and learning	No difference was observed in rural and urban areas.	Lack of awareness by teachers, caregivers and learners of EdTech limits the application and use of EdTech to support teaching and learning.
Limited availability of EdTech resources limits the application of EdTech to enhance teaching and learning	No difference between rural and urban areas.	Some resources, like TVs, radios, electricity, etc., are essential for the application and use of EdTech in teaching and learning but are lacking in some households and communities.
Parents or caregivers have multiple roles to play and require support in the application and use of EdTech to enhance teaching and learning	This finding was affirmed in both rural and urban areas.	Caregivers instruct their children to watch remote learning programmes, provide supervision, motivation, and some basic materials such as books, pens, tables and chairs to aid learning. This enhances participation in remote learning and learning through EdTech. However, caregivers require information and education on available EdTech. Some caregivers also need logistical support such as radio and TV.
Teachers' involvement in the application and use of EdTech is crucial but many of them lack the necessary resources and skills to handle the EdTech interventions effectively.	No difference between rural and urban areas.	The availability of EdTech resources for teachers, and their abilities to use these resources, influence the impact of EdTech on teaching and learning.
EdTech can be used to enhance inclusivity. However, varied needs require varied support.	No observed difference between rural and urban areas.	The introduction of GLTV and the GLRRP seeks to address the needs of different learners with disabilities, thereby promoting inclusivity. But further support in the form of in-person supervision is required to ensure the teaching and learning needs of learners with disabilities are fully met.

4.3.1 Government and non-governmental stakeholder roles

Provision of resources

Aside from the provision of rich content for delivery, the potential impact of EdTech on teaching and learning cannot be made when end-users are unable to access the programmes. EdTech consists of the entire ecosystem of technology-assisted teaching and learning. The availability of technological

infrastructure is crucial to enhancing EdTech at home, school, and among out-of-school children. All the head teachers and teachers we interacted with revealed the need to make adequate resources available to enhance teaching and learning through EdTech. Notwithstanding the interest in adopting and using EdTech for teaching and learning among teachers and learners, the non-availability of digital infrastructure served as a hindrance to the usage of EdTech. The limited or non-availability of computers, laptops, smartphones, and low-technology solutions for interactive learning, such as radio and television, accounted for the inability to access EdTech programmes by all.

> *"The government can provide smartphones and laptops to children from poor backgrounds and also provide remediation for the students with special needs to make them at par with those without any physical disability."* (Head teacher, Sekyere Afram Plains, Ashanti Region.)

> *"The government or NGOs can support with things like radio and television for those children with poor backgrounds but are willing to participate in remote / distance learning programme."* (Teacher, Sekyere Afram Plains, Ashanti Region.)

These responses depict the non-existence of the resources and materials that would enable both learners and teachers to successfully engage in teaching and learning using EdTech. A study by ↑Natia and Al-hassan (2015) indicated that the percentage of computers owned by students at the primary level was less than 5%, and 10% at JHS level, in Ghana.

EdTech awareness creation

Respondents indicated the need to carry out more educational and awareness campaigns regarding EdTech. Stakeholders (parents, teachers, and learners) were not well informed about the need to adopt EdTech for teaching and learning. Consequently, many had not fully come to accept how EdTech works. Although there might be some knowledge about EdTech, there is a need for further engagement with its benefits and how it can be used to improve teaching and learning outcomes and, in the process, promote inclusivity of children living with disabilities as well as the most marginalised.

> *"Campaigning and education are key. They should create the awareness that there is something like this and how it can be used."* (Head teacher, Ada West, Greater Accra Region.)

> *"To improve this, parents should be made aware of the benefits of the programme to the child."* (Head teacher, Kumasi Metro, Ashanti Region.)

4.3.2 Parental involvement, roles, and support

Using EdTech for learning takes place both at school and in the home. But learning at home cannot be effectively carried out without the assistance and / or contribution from parents. As is mostly the case, learners at home require

the help of their caregivers in home learning. The same is true of using EdTech solutions — parental involvement is vital for their effectiveness. In this section, we consider the various roles and support parents can provide learners as well as the support parents themselves require to ensure the successful use of EdTech in the home.

Parents' roles

The study found that the supervisory role of parents was crucial in the use of EdTech for teaching and learning. Children easily get distracted, especially when working with electronic devices. As a result, parents have to pay critical attention to what their children use these gadgets for. Hence, if closer attention is not given to the children while with these gadgets, there is a higher probability of the children diverting from learning and exploring other content that might be immaterial to what is being taught, either virtually or remotely, and defeat the purpose for which they were given the gadget. In addition, caregivers should act as supervisors in the home where they can provide guidance to children when engaged in remote learning programmes (to ensure they watch or listen to the programme even if they do not understand the lesson). Some quotes from the study participants indicate the possible involvement of parents in the learning process of their children.

> *"Parents can supervise their children to watch and listen to these programmes when the programme is being aired."* (Parent, Ada West, Greater Accra Region.)

> *"Yes, parents have a role to play in all of this. As for children, it is not only about teaching. You have to ensure they are seated and are paying attention and the parents and guardians are supposed to supervise that. When we were having our WhatsApp lessons, we consciously inform the parents and guardians to supervise their children. When you leave them behind the television set or you leave the phone with them, they can quickly divert to watching other things like cartoons so we often told the parents to be checking on their wards from time to time when lessons are being taught online." (Head teacher, Ada West, Greater Accra Region.)*

> *"Parents should always guide their wards when they are engaging in the remote learning programmes."* (Teacher, Kumasi Metro, Ashanti Region.)

In addition to supervising children to enhance the use of EdTech for teaching and learning, the data revealed that parents must encourage and motivate children to learn. Some children are less driven to learn, hence their parents should exercise a supervisory role in the learning process, especially with EdTech, to ensure that the children are motivated and interested in what they are learning. Parents can lead this by co-watching the lessons with their wards when they have time, helping them to solve questions, and engaging their

children in a discussion on the lessons, and so on. Here are some quotes illustrating what parents can do to support their children in remote learning.

> *"By encouraging and motivating them. Parents can also join their children when watching the programme when they are free. Those who are educated can be helping them with assignments and checking their books to know their performance."* (Parent, Ada West, Greater Accra Region.)

> *"Parents can encourage their children to participate in the remote learning programmes."* (Parent, Sekyere Afram Plains, Ashanti Region.)

> *"As parents, we should be able to encourage our children to learn so that they can do better than we did. We should also be able to supervise our children."* (Parent, La-Nkwatanang, Greater Accra Region.)

When the school or government runs an EdTech programme, parents should provide an enabling environment for participation in these programmes. They must know the particular times that the programmes are aired or telecast, and support children to take part in the programme at the scheduled time. We also found that parents need to guide their children when engaged in remote learning, just as they would be guided when in school. Parents should assume the role of teachers as much as they can by aiding children when needed or facilitating with assistance. This is important because a child might face some difficulties understanding what is being taught and, without any guidance or further explanation of the lessons, some children might end up not understanding and / or learning anything throughout the process.

> *"... because they have to check the time the programme will be shown on TV and broadcasted on radio sets so they tell their wards to sit down and participate."* (Head teacher, Ada West, Greater Accra Region.)

> *"... parents have a role to play. For instance, if it is time, parents should remind their children and ensure that they learn and participate in whichever programme is being carried out. They should get the timetable for themselves and their wards so that when it is time, they will alert them."* (Teacher, Sekyere Afram Plains, Ashanti Region.)

Related to ensuring participation is the provision of materials and resources to aid learning through EdTech. In addition to making the home safe for learning, parents have a role to ensure that children have the resources they need to successfully take part in teaching and learning through virtual and remote platforms. The unavailability of learning materials and gadgets for participating in such programmes will inhibit children from engaging in EdTech programmes. It was found that providing these resources was essential to ensuring participation in EdTech programmes.

> *"Parents should ensure that their children are given the necessary materials needed to help them study effectively." (*Parent, Kumasi Metro, Ashanti Region.)

> *"Parents can also improve in their responsibility towards their children by making sure that children do not lack anything they need in order to have a peace of mind so as to concentrate during distance lessons."* (Parent, Nanumba South, Northern Region.)

Support for parents

Parents are seen to be at the giving and receiving end when it comes to their child's learning. Inasmuch as parents need to provide some support and assume the role of teacher, parents themselves need support in order to execute their roles and responsibilities in enhancing EdTech for teaching and learning. The data revealed that parents do not have enough knowledge about the existence of EdTech and EdTech-related activities. For example, parents indicated that they were not well informed about the broadcasting times of the GLTV and GLRRP remote lessons. This affected their ability to ensure that their children took part. Evidence from the data shows that parents who were aware of the timetable prompted their children to participate in the lesson, even when they were not at home, whereas parents who had no knowledge about these remote learning programmes were unable to remind their children. Having access to the remote learning timetable, for instance, would aid parents to plan their schedules, including the timing of chores they assign to children, so they do not conflict with the TV or radio lessons. Some quotes backing this finding are given below.

> *"Parents must also be trained to know the times their children will be watching the learning programmes so that they won't be distracting or sending them to do things thereby making them lose concentration."* (Teacher, Ada West, Greater Accra Region.)

> *"Not all parents know about such programmes on television and radio, so it would be good if parents are made to know the times these programmes are shown. When this is done, even when it's time and the children are not at home, they can be called to come and learn."* (Parent, Kumasi Metro, Ashanti Region.)

In addition, parents need education on the important role of EdTech in the schooling and learning process of their children. In situations where parents do not have a good grasp of the significance of EdTech, they might deny their children the golden opportunity to learn from it. This might also affect the support parents themselves would be willing to offer their children to make their learning process through EdTech a smooth one. Parents and caregivers must be made aware that teaching and learning through EdTech is an integral part of schooling and learning, which seeks to achieve the same objectives as if the children were in a traditional classroom setting. A good understanding of EdTech and its relevance would go a long way to enhance the effectiveness of EdTech programmes, especially those delivered remotely

when children are home. A high proportion of parents would commit to engaging their children in EdTech programmes if they understood the importance of such programmes and how they contribute to the learning process of the child. Here are some quotes affirming the need for parents to be educated about EdTech and its related activities:

> *"Some parents do not see the need for their children to participate in these programmes. So, they would need education on the essence of such programmes so they would be willing to provide all the needed support for the children to participate in the programme."* (Parent, Sekyere Afram Plains, Ashanti Region.)

> *"I think there should be more advertisement and explanations about it on radio and television so that the parents will get involved in it and through this. If children are being educated through radio and TV stations, I think it will be very effective."* (Head teacher, Ada West, Greater Accra Region.)

> *"Parents should be well informed about the importance of allowing their children to study through the remote learning platforms."* (Parent, Kumasi Metro, Ashanti Region)

Finally, and crucially, some parents and households need logistical support. At the centre of EdTech is technological devices and gadgets for teaching and learning. Therefore, to successfully undertake any EdTech activity, devices used for the delivery of these activities including laptops, computers, smartphones, tablets, television, and radio, among others, must be provided to the users (learners). However, the data suggests that some parents are unable to afford these devices. This puts their children at a disadvantage and does not promote inclusivity. According to some respondents:

> *Parents should be assisted financially so they can afford the things the children need to make learning at home conducive for them. (Parent, Kumasi Metro, Ashanti Region)*

> *Parents need support to be able to buy the radio and television which is needed for the children to engage in the programme. For instance, my children know about the programme but because we didn't have television, they were not able to participate in the programme. (Parent, Kumasi Metro, Ashanti Region)*

4.3.3 Teachers' involvement, roles, and support

Role of teachers

Key to teaching and learning through EdTech is the involvement of teachers. In models where EdTech is administered through school to be used at home, teachers play a 'coaching' role in the application of EdTech by aiding their learners and ensuring that they engage in EdTech lessons. Appropriate guidance, provided by teachers at school, would make children more familiar

with EdTech and able to use it independently at home. This is very significant because once children become accustomed to EdTech, they are more likely to use it with little or no support / supervision from their parents. For instance, the GLTV and GLRRP remote learning programmes can be engaged with as either part of school activities or after-school activities. Teachers are able to provide further explanations to learners while they engage in remote learning. This helps learners better understand the lesson delivered remotely, especially when their parents or caregivers are unavailable or unable to assist them to understand. Study respondents admitted that the involvement of teachers is key in diverse ways.

> *"We, the teachers, can make time to assist these children in taking up these programmes."* (Teacher, Sekyere Afram Plains, Ashanti Region.)

> *"The teachers should also play roles by helping them in school. For instance, when they live close to school, they should put the children together in a room and put on the radio or television for them to learn because some of the parents do not even have television and radio in their homes."* (Parent, Sekyere Afram Plains, Ashanti Region.)

Support for teachers

The study found that 67%of head teachers and teachers (56% in urban areas and 79% in rural areas) were not familiar with the use of ICT tools for virtual teaching and learning, affirming the ICT gap identified in Ghanian primary schools by ↑Natia and Al-hassan (2015). Although some teachers are familiar with digital learning platforms and the use of ICT tools for teaching and learning, the majority do not use them due to lack of resources. It was found that many schools and teachers were unable to keep in touch with their students largely because they did not have the required skills and resources. Here are some excerpts from the viewpoint of teachers.

> *"We didn't organise any virtual lessons because we, the teachers, are not familiar with them and there are no items to do that. The students would not even be able to access them when we do." (Teacher, Sekyere Afram Plains, Ashanti Region.)*

> *"The school did not deliver any virtual class for the students because both teachers and students are not familiar with virtual lessons." (Teacher, Nanumba South, Northern Region.)*

In this regard, training and capacity-building in the use of ICT tools and promoting teaching and learning through EdTech are needed for teachers. This training, according to teachers, can be done online and at in-person workshops, as part of the in-service training for teachers. Remote learning platforms like GLTV and GLRRP can also be used, as there is evidence that some teachers are also learning from these platforms. To enhance teaching and learning through EdTech, the data revealed that teachers should be

provided with the skills to carry out virtual and remote teaching and learning. These skills include, but are not limited to, training on how to use and handle smart devices, such as smartphones and tablets as well as laptops, in delivering EdTech content. Equally, teachers should be trained on how to monitor and assess children while delivering remote learning through EdTech.

> *"There should be in-service training for teachers about distance learning programmes so that day in, day out they will be abreast with current issues and how to supervise the children to make use of the learning platforms."* (Head teacher, Ada West, Greater Accra Region.)

> *"I think teachers require training on how to use laptops and computers to organise remote learning classes."* (Head teacher, Kumasi Metro, Ashanti Region.)

> *"We need training on how to carry out distance learning for some teachers who do not know how to operate digital platforms like Zoom."* (Head teacher, Kumasi Metro, Ashanti Region.)

In addition to training and capacity-building, teachers require tools and resources to enhance teaching and learning through EdTech. Coupled with unfamiliarity with digital platforms in delivering EdTech content is the unavailability of the tools for using these platforms. Making such tools available would go a long way to enable the use of digital platforms since these are mutually inclusive. Also, we found that providing devices like radio, TV, and Bluetooth speakers in schools would be instrumental in enhancing the use of EdTech for teaching and learning.

> *"We need the tools before you can carry out distance learning, we would need a laptop and smartphone, and in this case, majority do not have a laptop and few of them also do not have a smartphone. Likewise the students; as for them, they do not have it at all and the school has no laptops and computers even for teaching Information Communication Technology (ICT). So, using these digital platforms becomes problematic."* (Head teacher, Sekyere Afram Plains, Ashanti Region)

> *"When we get the needed materials like laptops, projectors, radios, Bluetooth speakers, pen drives and DVD players we can successfully engage the children through distance learning. In addition to these materials, we would also require training on how to deliver distance learning."* (Teacher, Kumasi Metro, Ashanti Region.)

4.3.4 Promoting inclusiveness through EdTech

Education can be made more inclusive with the use of EdTech to deliver lessons to all groups of learners, including the disabled and marginalised. The use of assistive technology, gadgets, equipment, and products helps to increase, maintain, and improve the performance of learners. It could also increase access to education and enable students to take greater ownership

and control of their learning experience by reducing the traditional barriers to education.

The Covid-19 pandemic has presented the opportunity to restructure the education system to include sustainable remote / virtual learning options. These platforms could serve as avenues to access teaching and learning outside the classroom. In delivering remote / virtual learning, a host of gadgets and devices are required to facilitate lesson delivery and uptake. In this section, we look at how out-of-school children and children with disabilities can be included in teaching and learning through EdTech.

The data revealed that to make EdTech available for out-of-school children, course content can be uploaded onto smart devices like tablets and smartphones and made available to this group of children who are not ready to go back to the classroom but are willing to learn. With this approach, this group of learners can be taught in the comfort of their homes. The study also found that such children can be engaged through low-technology devices, such as television and radios, while at home. It revealed, too, that learners can engage with EdTech at the community level. To enhance teaching and learning through EdTech at this level, respondents suggested that community libraries or designated areas be equipped with the required technological equipment to provide such content to learners without having to be in the classroom.

For disabled children and learners with special needs, well-trained facilitators are needed to enhance teaching and learning through EdTech. The visually impaired, for example, should be assisted with the appropriate means, like audio, a braille version of the content, and smart devices that can self-read content, while the hearing impaired can be assisted with sign language interpreters.

In the study sample, teachers and learners reported the lack of necessary EdTech tools to support teaching and learning not only for learners but more especially for those with disabilities. To promote an all-inclusive learning environment, teachers and learners mentioned the need to be provided with well-equipped computer laboratories, tablets, televisions, and radio sets, among other gadgets, as well as digital skills training to facilitate an EdTech-based learning environment. This would help learners at home to access educational materials for continuous learning. Some teachers suggested that:

> *"They should build ICT centres or video libraries in the communities and put big-screen televisions there so that children in the communities who do not have television sets and radios at home can also access the channels."* (Head teacher, Ada West, Greater Accra Region.)

> *"They can be engaged with learning on technology because some of them just don't want to come to the classroom so they can be taught on TV. They can also be engaged with pre-recorded lessons (videos and audios) which can be accessed on some devices like mobile phones."* (Teacher, Kumasi Metro, Ashanti Region.)

> *"Instructors should be trained with the requisite technological skills to enable them to fully assist children with special needs. In addition, the needed technology should be provided and made available to all children, especially those from poor families."* (Teacher, Kumasi Metro, Ashanti Region.)

> *"Out-of-school and non-returning children who wish to learn and catch up with school can be supported by tailored virtual lessons that are specifically designed for them and made available to them in the communities and at home."* (Head teacher, Tamale Metro, Northern Region.)

An all-inclusive education environment through EdTech can ensure that all learners, regardless of status, are able to effectively learn alongside their peers. This would require the widespread use and adoption of both smart and non-smart devices for lesson delivery and learning. Thus, teachers and learners need to be supported with the appropriate tools and gadgets to facilitate both face-to-face and remote teaching and learning.

4.4 Discussion of findings

The Covid-19 pandemic led to the abrupt closure of schools in Ghana for over 10 months. During this period, teaching and learning were halted at the school level in both rural and urban areas. The government, through the MoE and GES, introduced remote teaching and learning through television and radio to lessen disruption to teaching and learning. The study found that the lack of resources inhibited the facilitation of remote teaching and learning. Head teachers and teachers indicated that schools were not equipped with the necessary resources and there was also no assurance that learners had the needed resources such as mobile phones, television, and radio at their disposal at home to participate in remote lessons. This is related to the asset ownership disparity in urban and rural areas (↕Agbe & Sefa-Nyarko, 2020).

In spite of the non-availability of the necessary resources in schools and at home, the study discovered that virtual learning using WhatsApp was initiated by some teachers to engage their students. The study discovered that, during school closures, learners at home were engaged through private tuition by close relatives or hired teachers, remote learning, and self-driven learning. Although the practice was prevalent in urban and rural areas, about 78% of learners interviewed in rural areas indicated that they had little to no time to learn compared to only 29% in urban areas. This was because they had to dedicate a significant amount of their time supporting the family business in

addition to household chores. This work included farming, fishing, and hawking, among others. Others took advantage of the long break to learn a new skill or trade such as hairdressing, auto mechanic repair, and welding. This is similar to findings from Tanzania where approximately 36% of school children worked on the family farm during school closures (↑Oza & Cilliers, 2021). However, learners with physical disabilities were engaged more in learning activities than learners without a disability. The study found that, where the necessary resources such as television sets were available, learners with disabilities benefited more from remote learning because they had more free time and comfort to partake in remote teaching and learning than they would do for in-person teaching and learning. ↑Coflan and Kaye (2020) affirmed that remote learning can be used to support children with special learning needs and disabilities if the right resources and aids are provided.

The study discovered that, since schools reopened, some schools are blending remote with in-person teaching and learning. For some teachers, it was reported that the blended approach was an opportunity to make use of the activity books that were produced and shared among learners in rural areas mainly because teachers believed that due to lack of technological resources, learners did not access remote learning programmes, especially in rural areas. Access for GLTV and GLRRP was found to be 52% and 27% respectively in urban and rural areas. The use of blended teaching and learning was also taken up because parents, teachers, and learners acknowledged that remote learning was beneficial. As a result, the teachers we interviewed declared that there was some difference in performance between learners who took advantage of remote learning during school closures and those who did not partake in any remote learning. The relevance of remote learning among learners revealed that remote learning encourages guided learning and self-driven learning. Teachers who made time to watch some of the lessons indicated it helped sharpen their teaching skills and as well served as a reference for teaching and learning materials.

Furthermore, study participants who accessed the GLTV and GLRRP remote learning programmes indicated that access was not smooth as there were distractions during lesson delivery from caregivers and power outages, and programme timing was not favourable. Furthermore, sometimes the lessons were not clear enough to understand. Hence, it was suggested that these issues be looked at to build a more robust and supportive system for teaching and learning. Particularly, there was a need for awareness creation and sensitisation of caregivers to allow their children to partake in remote lessons rather than engage in other household activities.

The study identified that caregivers should provide supervisory roles and if possible, provide the necessary resources to support their children to

participate in remote learning. Aside from the availability of TV and radio, children need motivation and basic resources such as books and pens when participating in remote lessons. ↑Đurišić and Bunijevac (2017) affirm that there is a strong relationship between caregivers' involvement in children's education and positive learning outcomes. Hence, caregivers have a significant role to play in promoting the effective use of remote learning. Teachers, on the other hand, have equally important roles to play. According to ↑Đurišić and Bunijevac (2017) establishing cordiality between parents, teachers, learners, and the larger community ensures positive educational outcomes, and academic success. Hence, there is a need to tighten the relationship between teachers and caregivers, as only a few teachers indicated contacting caregivers to encourage and provide guidance for children to participate in remote learning. Interactive engagement among teachers, parents and learners can make the use of EdTech effective (↑Mundy & Hares, 2020).

The study found that only 22% and 11% of teachers indicated the use of WhatsApp for virtual lessons in rural and urban areas respectively. Also, 56% and 79% of head teachers and teachers in rural and urban areas respectively revealed they are unfamiliar with virtual learning platforms and how to deliver lessons virtually or remotely. According to ↑Naylor and Gorgen (2020), without support or training, EdTech on its own cannot produce the desired positive outcomes in teaching and learning. Hence, teachers require capacity building in that regard, and cost-efficient means such as virtual or remote training platforms, which can be adopted to build the capacities of teachers.

5. Conclusion

The use of remote learning platforms would have been better supported if they had been incorporated into the education system more fully. Until the emergence of the Covid-19 pandemic and consequent school closures, there was little knowledge of lesson delivery via television and radio, although CENDLOS had been earlier established for this purpose but it had been relatively inactive since 2009. Hence, many learners with access to television and radio barely participated in such lessons. Also, the use of remote or virtual means of teaching and learning was not much explored by teachers as an option for lesson delivery. To ensure that school closures did not result in an end to education (at least until face-to-face interactions resumed), schools needed to restructure the teaching and learning environment into an online space by using tools they were not familiar with, while at the same time making the necessary adjustments to ensure that the content was accessible to every student in the remote classroom. This was more common in private schools and among privileged learners in urban areas whose schools could more conveniently put such measures in place, and whose parents could afford the new means of lesson delivery. However, r learners with less-privileged backgrounds had little access not only to internet-based lessons but also those delivered through television and radio. Many of them were thus left with no learning option during school closures. This was reported to have resulted in the low performance of students after schools reopened, meaning that lessons delivered before the closure had to be re-taken.

Some parents stated that they were initially unaware of remote lessons being aired on the television and radio and hence did not bother to supervise their children to participate. Also, some parents' initial unawareness of lessons being aired on television and radio might have led to their involving their children in economic activities rather than learning, since — in their minds — there was no learning of any form going on during the closure. Learners' non-participation in any form of learning may also have accounted for their involvement in other activities, which resulted — among other things — in teenage pregnancies and a reported increase in the dropout rate. Greater participation in remote learning by learners, supervised by parents, is more likely to reduce time spent on unproductive activities when school is not in session.

The most important facilitators of good learner experiences of EdTech education were parental involvement and teachers' (and head teachers') encouragement. Mixed findings were found about the popularity of radio and television learning programmes. Collective learning was encouraged in

communities where households had limited access to handsets or television sets, in which case, places of worship and community centres were used to air some of the radio programmes that were made available on pen drives by programme promoters.

Learners with disabilities found EdTech more convenient where they could access and utilise the opportunity, compared with those children without disabilities. For these children, house chores and the urge to engage in economic activities were the biggest inhibitors to utilisation, holding infrastructural deficits constant.

Post school closures, some teachers have found it useful to integrate TV and radio programmes into the school timetable to utilise the quality of the teaching that is offered virtually. This has good prospects for EdTech uptake in Ghanaian schools if it is rolled out, sustained, and scaled by the government and stakeholders.

6. Policy implications

EdTech interventions can improve teaching and learning outcomes and promote inclusivity. However, the education system needs to strengthen engagement between schools and parents, to provide guidance on how to structure, schedule, and monitor homeschooling. This could be done through existing school management committees and parent–teacher associations (PTAs) to improve community oversight and participation in school governance, and improve the relationship and accountability between schools, parents, and communities.

The findings highlight that virtual lesson delivery and learning do not take place when there is inadequate infrastructure and a lack of digital skills to deliver such lessons. While engaging with parents on their supervisory roles with regards to remote learning, the capacity of teachers needs to be built and supported to effectively leverage ICT to deliver online lessons. This can be delivered by the MoE and GES as part of in-service capacity-building training for teachers. As a long-term broader objective, this sort of training should be integrated into the teacher training curriculum in the Colleges of Education so that teachers enter the profession already equipped with adequate ICT skills to handle EdTech effectively. Training teachers in the use of digital resources and providing them with the necessary infrastructure to deliver virtual lessons and assess students would lead to an improved remote learning environment and the participation of more learners.

To ensure an all-inclusive learning environment would require the widespread use and adoption of both smart and non-smart devices for lesson delivery and learning. Thus, the government needs to prioritise education infrastructure and teaching and learning tools for teachers and learners, particularly in rural areas, to facilitate face-to-face and remote teaching and learning. Such materials should include offline EdTech audio-visual devices, like tablets and laptops with preloaded content, to facilitate learning irrespective of internet accessibility. The government's agenda of providing every teacher with a laptop is already consistent with this recommendation but should be fast-tracked and should prioritise the special needs of teachers and children in remote and resource-constrained schools and communities.

Additionally, in designing and rolling out remote learning programmes such as GLTV and the GLRRP, policymakers — the MoE, GES and non-government stakeholders — should be mindful of limited access to physical infrastructure (like electricity) and household devices (like TV, radio, etc.) when informing the design mix and mode of delivery to be accessed by all children. Specifically, it is important to always make special provisions and arrangements to broadcast lessons to children / learners in communities where there is no electricity and

where access to TV and radio are rare. In such areas, the stakeholders should consider providing logistics for school- or community-level broadcasts of the TV lessons, so that all children can have unimpeded access. This would also facilitate peer-to-peer learning among children.

7. Bibliography

This bibliography is available digitally in our evidence library at https://docs.edtechhub.org/lib/2A5NQEV8

Agbe, E., & Sefa-Nyarko, C. (2020). *Ghana's education response during the COVID-19 crisis: EdTech to the rescue?* EdTech Hub. https://docs.edtechhub.org/lib/QJ783WH5. (details)

Barron, M., Cobo, C., Munoz-Najar, A., & Sanchez Ciarrusta, I. (2021). *The changing role of teachers and technologies amidst the COVID 19 pandemic: key findings from a cross-country study*. https://blogs.worldbank.org/education/changing-role-teachers-and-technologies-amidst-covid-19-pandemic-key-findings-cross. (details)

Bonner, P. J., Warren, S. R., & Jiang, Y. H. (2018). Voices From Urban Classrooms: Teachers' Perceptions on Instructing Diverse Students and Using Culturally Responsive Teaching. *Education and Urban Society*, *50*(8), 697–726. https://doi.org/10.1177/0013124517713820. (details)

Borzekowski, D. L. G. (2018). A quasi-experiment examining the impact of educational cartoons on Tanzanian children. *Journal of Applied Developmental Psychology*, *54*, 53–59. https://doi.org/10.1016/j.appdev.2017.11.007. Available from https://www.sciencedirect.com/science/article/pii/S0193397317300850. (details)

Borzekowski, D. L. G., Lando, A. L., Olsen, S. H., & Giffen, L. (2019). The Impact of an Educational Media Intervention to Support Children's Early Learning in Rwanda. *International Journal of Early Childhood*, *51*(1), 109–126. https://doi.org/10.1007/s13158-019-00237-4. (details)

Burns, M. (2006). *Improving teaching quality in Guinea with interactive radio instruction*. *Working paper*(2), 15. https://www.infodev.org/infodev-files/resource/InfodevDocuments_500.pdf. (details)

Coflan, C. M., & Kaye, T. (2020). *Using education technology to support learners with special educational needs and disabilities in low- and middle-income countries*. EdTech Hub. https://doi.org/10.53832/edtechhub.0021. Available from https://docs.edtechhub.org/lib/2WY8H4WW. (details)

Damani, K., & Mitchell, J. (2020). *Radio: A Rapid Evidence Review* (Rapid Evidence Review No. 4). EdTech Hub. https://docs.edtechhub.org/lib/YMWE6FR6. (details)

Đurišić, M., & Bunijevac, M. (2017). Parental involvement as an important factor for successful education. *Center for Educational Policy Studies Journal*, *7*(3), 17. https://eric.ed.gov/?id=EJ1156936. Available from https://eric.ed.gov/?id=EJ1156936. (details)

GLSS. (2017). *Ghana Living Standard Survey* (No. 7; p. 343). https://www.statsghana.gov.gh/gssmain/fileUpload/pressrelease/GLSS7%20MAIN%20REPORT_FINAL.pdf. (details)

Gocen, G., & Okur, A. (2013). The effects of TV on speech education. *Educational Research and Reviews*, *8*(2), 63–68. https://eric.ed.gov/?id=EJ1008317. Available from https://eric.ed.gov/?id=EJ1008317. (details)

Ho, J., & Thukral, H. (2009). Tuned in to student success: assessing the impact of IRI for the hardest-to-reach. *Journal of Education for International Development*, *4*(2), 34–51. https://www.edc.org/tuned-student-success-assessing-impact-iri. (details)

IPA. (2020). *Innovations for Poverty Action*. 32. https://www.poverty-action.org/sites/default/files/presentation/IPA-Ghana-RECOVR-Survey-Webinar-July-2-2020-Presentation.pdf. (details)

Morris, E., Philip, M., Othman, A. F., Mitchell, J., Quiones, E. J., & Leatxe, D. (2009). *Radio Instruction to Strengthen Education (RISE) in Zanzibar. Learning gains assessment: more than child's play.* Education Development Center, Inc. and Ministry of Education and Vocational Training. https://cupdf.com/document/radio-instruction-to-strengthen-education-rise-in-iddedcorgsitesiddedcorgfilesradio.html. (details)

Mundy, K., & Hares, S. (2020, April 16). Equity-Focused Approaches to Learning Loss during COVID-19. *Center For Global Development*. https://www.cgdev.org/blog/equity-focused-approaches-learning-loss-during-covid-19. (details)

Nasib, T. (2017, September 1). ECT 300 Educational Technology: What are some of the limitations of using live radio broadcasts in teaching? *Somi*. https://mysominotes.wordpress.com/2017/09/01/ect-300-educational-technology-what-are-some-of-the-limitations-of-using-live-radio-broadcasts-in-teaching/. (details)

Natia, J., & Al-hassan, S. (2015). Promoting teaching and learning in Ghanaian Basic Schools through ICT. *International Journal of Education and Development Using ICT*, *11*(2), 113–125. https://www.learntechlib.org/p/151844/. (details)

Naylor, R., & Gorgen, K. (2020). *Overview of emerging country-level response to providing educational continuity under COVID-19: What lessons learned*

from supporting education for marginalised girls that could be relevant for EdTech responses to COVID-19 in low- and middle-income countries? 22. https://edtechhub.org/wp-content/uploads/2020/05/marginalised-girls.pdf(details)

Núñez, F. (2021, January 8). *Radio in Education in the Face of COVID-19*. Institute for the Future of Education. https://observatory.tec.mx/edu-bits-2/radio-education-and-covid19. (details)

Olumorin, C. O., Aderoju, M. A., & Onojah, A. O. (2018). Students Awareness and Utilization of Educational Broadcasts to Learn in Ogbomoso, Oyo State Nigeria. *Turkish Online Journal of Distance Education*, *19*(3), 182–192. https://doi.org/10.17718/tojde.445122. Available from https://eric.ed.gov/?id=EJ1183355. (details)

Oza, S., & Cilliers, J. (2021). *What Did Children Do During School Closures? Insights from a Parent Survey in Tanzania*. Research on Improving Systems of Education (RISE). https://doi.org/10.35489/BSG-RISE-RI_2021/027. Available from https://riseprogramme.org/publications/what-did-children-do-during-school-closures-insights-parent-survey-tanzania. (details)

Shettima, Y., Makinta, A. W., & Tomsu, S. M. (2020). Significance of Radio and Television Learning Programmes on the Academic Achievement of Learners during COVID-19 Lockdown in Maiduguri, Borno State, Nigeria. *International Journal of Innovative Information Systems & Technology Research*, *8*(3), 54–60. https://seahipaj.org/journals-ci/sept-2020/IJIISTR/full/IJIISTR-S-6-2020.pdf. (details)

Taddese, A. (2020). *EdTech in Ghana: a rapid scan*. EdTech Hub. https://docs.edtechhub.org/lib/4TKSDH2I. (details)

Trucano, M. (2010, May 11). *Interactive Radio Instruction : a successful permanent pilot project?* [Worldbank.org]. https://blogs.worldbank.org/edutech/iri. (details)

Ullah, S., Ali, M., Nisar, M., Farid, T., Ali, I., & Alam, S. (2014). The impacts of electronic media on academic performance of female student. *International Journal of Economics, Commerce and Management*, *2*(9). http://ijecm.co.uk/wp-content/uploads/2014/09/2922.pdf. (details)

UNESCO. (2020, June 2). *Learning through radio and television in times of COVID-19*.

https://en.unesco.org/news/learning-through-radio-and-television-time-covid-19. (details)

UNICEF. (2020a). *Guidance: assessing and monitoring learning during the COVID-19 crisis*. Humanitarian Response. https://reliefweb.int/sites/reliefweb.int/files/resources/learning_assessments_during_covid-19_final.pdf. (details)

UNICEF. (2020b). Can broadcast media foster equitable learning amid the COVID-19 pandemic? *Evidence for Action*. https://blogs.unicef.org/evidence-for-action/can-broadcast-media-foster-equitable-learning-amid-the-covid-19-pandemic/. (details)

Uwezo. (2020). *Are Our Children Learning? The Status of Remote-learning among School-going Children in Kenya during the Covid-19 Crisis*. Humanitarian Response. https://www.humanitarianresponse.info/es/operations/kenya/document/uwezo-2020-are-our-children-learning-status-remote-learning-among-school. (details)

Watson, J., & McIntyre, N. (2020). *Educational Television: Rapid Evidence Review*. Zenodo. https://doi.org/10.5281/zenodo.3956366. Available from https://edtechhub.org/wp-content/uploads/2020/07/RER-TV.pdf. (details)

World Bank. (2020). How countries are using edtech (including online learning, radio, television, texting) to support access to remote learning during the COVID-19 pandemic [Text/HTML]. *World Bank*. https://www.worldbank.org/en/topic/edutech/brief/how-countries-are-using-edtech-to-support-remote-learning-during-the-covid-19-pandemic. (details)

Wright, J., Huston, A., Murphy, K., Peters, M., Pinõn, M., Scantlin, R., & Kotler, J. (2001). The Relations of Early Television Viewing to School Readiness and Vocabulary of Children from Low-Income Families: The Early Window Project. *Child Development*, *72*(5), 1347–1366. https://doi.org/10.1111/1467-8624.t01-1-00352. Available from https://pubmed.ncbi.nlm.nih.gov/11700636/. (details)

Yelkpieri, D., Kweku, W. E.-D., & Kwesi. (2011). Patronage of Educational Broadcasts and its Effects on Academic Growth of Students of Winneba and Apam Senior High Schools in the Central Region of Ghana. *Academic Leadership: The Online Journal*, *9*(1). https://scholars.fhsu.edu/alj/vol9/iss1/40. (details)