

# SCALING EDUCATION TECHNOLOGY INNOVATIONS

**A POLICY NETWORK  
ANALYSIS CASE STUDY  
IN UGANDA**

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**Final Report**  
June 2023

In partnership with

**WAR**  
child



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### Final Report

June 2023

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To share your thoughts on reading this report or offer any feedback for further editions and improvement of this study, please engage with us via email at [selin.turan@warchild.net](mailto:selin.turan@warchild.net)

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## **LIST OF ACRONYMS**

AAU	Association of African Universities
AKDN	Aga Khan Development Network
AVU	African Virtual University
BIA	Bridge International Academies
BPID	Belgium Partner In Development
BRAC	Bangladesh Rural Advancement Committee
BT	Building Tomorrow
CSU	Cheshire Services Uganda
DRC	Democratic Republic of Congo
DUV	Digital Uganda Vision
ECHO	European Civil Protection and Humanitarian Aid Operations
ECLOF	Ecumenical Church Loan Fund
ECW	Education Cannot Wait
EDPG	Educational Development Partners Group
EdTech	Education Technology
Edukans	Edukans Foundation
Eduroam	Education Roaming Service
EES	Edukans Education Services
ETCL	Eight Tech Consults Limited
EU	European Union
FAWE	Forum for African Women Educationalists
FCA	Finn Church Aid
FCDO	Foreign, Commonwealth and Development Office of United Kingdom
GBCE	Global Business Coalition for Education
GEANT	Gigabit European Academic Network
GIZ	German Agency for International Cooperation
GoU	Government of Uganda
GPE	Global Partnership for Education
HP	Hewlett-Packard
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IIEP	UNESCO International Institute for Educational Planning
(I)NGO	(International) Non-Governmental Organisation
Intl Org	International Organisation
IT	Information Technology
KIX	Knowledge and Innovation Exchange
LCD	Leonard Cheshire Disability
MoE&S	Ministry of Education and Sports
MoICT&NG	Ministry of Information and Communications Technology and National Guidance
MoU	Memorandum of Understanding

NCDC	National Curriculum Development Centre
NCHE	National Council for Higher Education
NITA	National Information Technology Authority
NRC	Norwegian Refugee Council
NSS	FNational Social Security Fund of Uganda
NTC	National Teachers College
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OEACP	Organisation of African, Caribbean and Pacific States
Org	Organisation
ORWBBA	Open Roaming Wireless Broadband Alliance
PI	Plan International
RENU	Research and Education Network for Uganda
RTI	Research Triangle Institute
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SCL	Service Cops Limited
SCM	Student Changemakers
SFLF	School for Life Foundation
STIR	Schools and Teachers Innovating for Results
TFL	Teach for Lebanon
TFU	Teach for Uganda
TIET	Teacher/Tutor, Instructor Education and Training Department
UCC	Uganda Communication Commission
UEC	Uganda Education Consortium
UEiEWG	Uganda Education in Emergencies Working Group
UICT	Uganda Institute of Communications and Technology
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations International Children’s Emergency Fund
US	United States
USAID	United States Agency for International Development
VVOB	Flemish Association for Development Cooperation and Technical Assistance
WCH	War Child

## EXECUTIVE SUMMARY

This report presents the results of an Education Technology (EdTech) Policy Network Analysis conducted in Uganda as part of War Child's research agenda on how to scale up EdTech in countries affected by conflict, funded by the Global Partnership for Education Knowledge and Innovation Exchange, (KIX) a joint endeavor of the International Development Research Centre and the Global Partnership for Education. It aims to identify key actors and relationships in the EdTech sector in Uganda to understand how EdTech can be better utilised to accelerate progress towards SDG4, with a particular focus on how EdTech programmes, such as War Child's Can't Wait to Learn, can be effectively scaled up. The study consists of three methods: semi-structured interviews with six key informants in the EdTech sector, an analysis of relevant policy documents, and a social network analysis of relationships between EdTech actors.

The social network analysis identified 89 different actors who are active in the EdTech field in Uganda, with 67 links in between them explaining the nature of their relationships to one another. . Actors in the network represented diverse types of organisations, in particular international organisations (e.g. UN agencies), international NGOs, private companies, and the government. International organisations and bilateral agencies tend to hold the most central positions in the EdTech network and connect many other types of organisations, suggesting that the creation of an EdTech policy or strategy within the sector may be led by international development organisations. However, the national government is also a key player, particularly in linking various types of actors.

The Ugandan government's policy framework creates a clear role for EdTech, with explicit mention of information technology in education from the Ministry of ICT & National Guidance and an accompanying Digital Education Agenda 2022-26. To take advantage of this favourable environment, interview respondents indicated that full commitment at high levels of government, reduction of taxes on internet access and equal access to technology would be important pre-conditions for effective scale-up of EdTech. However, the clear policy framework, active work to address teachers' skills gaps, and the strength of the existing EdTech programmes in Uganda (partly due to the COVID-19 pandemic) create opportunities for scaling up EdTech programmes.



## Key Recommendations

The Policy Network Analysis suggests that there are significant opportunities and a supportive environment for large-scale EdTech programming in Uganda. To fully leverage these opportunities and the supportive environment, a successful approach includes working within the government framework and localising EdTech programmes (including separate rural provisions where necessary). We present our key recommendations to EdTech actors, including international organisations, policy-makers, practitioners, and private sector actors below:

### **1. Fostering further partnerships with the government and capitalising on its readiness for scaling EdTech**

Capitalise on the government's readiness and its role as a key actor in the EdTech environment in Uganda. This includes leveraging its relationships, political will, and existing robust policies. Wherever possible, include the government as an EdTech partner, and work to strengthen existing partnerships with government agencies.

### **2. Capitalising on the post-COVID moment for further advocacy and awareness raising on EdTech**

Capitalise on the post-COVID moment, in particular in advocacy work on EdTech. In the current moment, many stakeholders have come to realise and embrace the value of the use of technology in education, and this momentum can be sustained with adequate campaigns and promotion.

### **3. Localising EdTech policies and programmes and consulting with local actors**

Always localise policies and programmes. Prior to the development and implementation of any EdTech intervention, consult with local communities. Be prepared to alter and contextualise interventions depending on the needs and desires of local educators, students, and families.

### **4. Developing separate EdTech policies and strategies for rural and urban populations**

Consider separate EdTech policies and goals for rural and urban populations, given disparities in access to electricity, internet connectivity, and devices. Additionally, rural and urban populations will likely express different needs in relation to education and so consultation with communities is necessary prior to developing any EdTech intervention (see the third recommendation above).

### **5. Integrating EdTech into teacher training programmes**

Strengthen the integration of basic EdTech skills within initial teacher training (not only professional development), so that new teachers enter schools with a base minimum technological knowledge and ability to teach using EdTech.

# 1. INTRODUCTION

## 1.1 KIX Project Overview

The education systems of conflict-affected countries are under enormous pressure and face serious challenges concerning equitable access to quality education, such as overcrowded classrooms, overburdened and unqualified teachers, and a lack of adequate financing for education (Burde et al. 2015; Burde et al. 2017). In 2020, War Child was awarded the Global Partnership for Education Knowledge and Innovation Exchange (KIX) grant to generate knowledge and evidence on how education technology (EdTech) innovations can be adapted and scaled to improve education access and quality for refugee and displaced children in conflict-affected countries. KIX is a joint endeavour of the [International Development Research Centre](#) and the [Global Partnership for Education](#) to connect expertise, innovation, and knowledge to support GPE-partner countries to strengthen education systems and accelerate progress toward SDG 4. War Child's KIX research programme is taking place in Chad, Uganda, and Sudan, and is centred on its innovative education programme, [Can't Wait to Learn](#).

While the use of EdTech in classrooms continued to increase drastically over the past decade, the COVID-19 pandemic laid bare its importance in providing children with access to equitable and quality education when in-person education is no longer possible. The pandemic has had a devastating impact on children's learning and caused significant learning loss globally, affecting 90 per cent of learners worldwide at its peak (UNICEF, UNESCO, The World Bank, 2022). It is simply not enough for schools to be re-opened as children will need tailored and sustained support to help them catch up after the pandemic. This situation threw EdTech to the forefront of education sector dialogues, strengthening the case for increased investment and scale-up. Despite the momentum surrounding EdTech catalysed by COVID-19, there is still a lack of evidence on its effectiveness, especially the medium-to-long-term effects on learning (Global Education Evidence Advisory Panel, 2020; Major et al., 2021). In addition to the evidence on effectiveness, data on cost-effectiveness and assessment of the policy environment are needed to inform decisions surrounding EdTech's inclusion in national education systems and contribute to the progress towards SDG 4. To tackle the question of how to achieve impact at scale and holistically strengthen the evidence base for EdTech in EiE, War Child developed a comprehensive portfolio of research studies and focused on five complementary areas of 'research for scale': 1) effectiveness, 2) coverage, 3) quality assurance, 4) value for money, and 5) policy. The specific studies under each area of research help War Child achieve its objective and generate knowledge and evidence on how to adapt and scale up an EdTech programme in conflict-affected countries.

## 1.2 Can't Wait to Learn Programme Overview

The innovation focus of War Child's research is the Can't Wait to Learn programme, a promising solution to close the education gap for millions of children around the world affected by conflict. Can't Wait to Learn is a curriculum-aligned EdTech programme which aims to provide children access to quality education at home, in the formal school setting and the community in non-traditional school settings. It offers children the opportunity to (continue to) learn to read, write, and practice maths through self-paced games, which are co-created to reflect their world and context. The programme can be accessed on dedicated, preloaded tablets and through a mobile application on personal iOS and Android devices depending on the game in question, which can be played on and offline. War Child works with the Ministries of Education to ensure that learning objectives are based on the national curricula. Children's progress is monitored and used for further improvements of the programme. Can't Wait to Learn is currently operational in Chad, Jordan, Lebanon, South Sudan, Uganda, and Ukraine.



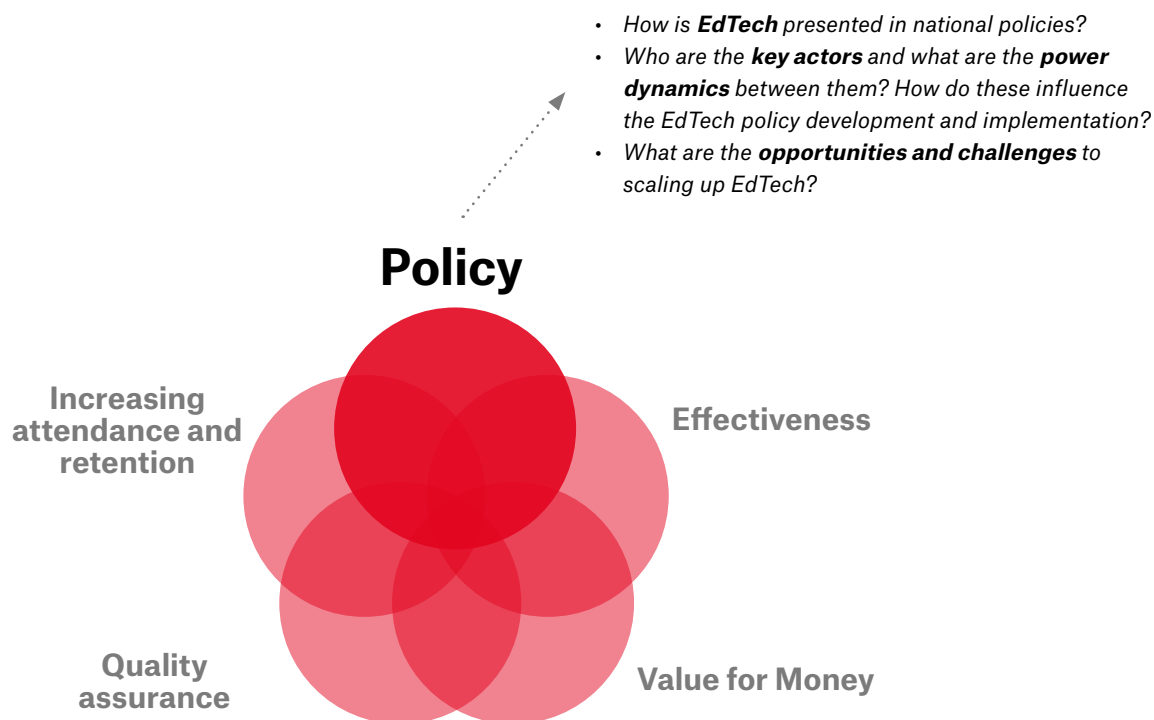
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In Uganda, Can't Wait to Learn is an English reading and numeracy game-based learning programme delivered on a tablet. It is aligned with the national primary three (P3) level curriculum, with all content approved by the National Curriculum Development Centre (NCDC). The game includes three main components: 1) the game world, which is an experiential setting with local characters and stories that are co-designed with children, 2) instructional videos of local children and adults explaining academic concepts and tasks, and 3) mini-games, in which children engage with academic content and progress to more difficult concepts and skills as and when they pass each mini-game, i.e. the games are individually paced. An animated game guide begins each mini-game by providing instructions, and children receive in-game rewards to foster motivation. Each child has their own account which helps the program team monitor on usage and progression through the game content.

### 1.3 Aim of the Study

The Can't Wait to Learn programme has entered a new phase on its scaling journey with War Child's KIX-supported research programme, which is focused on five complementary areas of 'research for scale': **1) effectiveness, 2) value for money, 3) quality assurance, 4) increasing attendance and retention, and 5) policy** (see Figure 1 below). An assessment of the policy environment is crucial to understand the context and conditions to effectively scale up EdTech and accelerate progress towards SDG 4. It is pivotal to understand the education sector priorities of the Ministry of Education and other education stakeholders in conflict-affected countries to facilitate EdTech's integration into education policies and planning and promote its use by the Education in Emergencies (EiE) actors.

**Figure 1:** War Child’s five complementary areas of research for scale with a focus on policy



To achieve this objective and support the Can't Wait to Learn programme in its scaling journey, we developed and conducted a Policy Network Analysis to identify influencing factors in EdTech policy and programme development and implementation processes, actors in the EdTech field and relationships between them. Through a case study in Uganda, this research investigates country-specific opportunities and challenges for the inclusion and scale-up of EdTech in national education systems of conflict-affected countries. Thus, it investigates the following questions:

1. How is EdTech presented in national policies?
2. Who are the key actors in EdTech sector, and what are the power dynamics between them? How do these influence EdTech policy development and implementation?
3. What are the opportunities and challenges to scaling up EdTech?



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## 2. METHODOLOGY

In order to uncover pivotal actors, relationships, and policies that shape EdTech in Uganda, we used a mixed-methods research design that combined key informant interviews, analysis of policy and organisational documents, and social network analysis of relationships between actors working in EdTech. Qualitative data from interviews and documents were analysed together using methods of open coding and thematic analysis in Dedoose software, while quantitative data on social networks were analysed by computing methods of network structure and creating visualisations (i.e. network sociograms) using the R statistical programming language. Together, these methods offer a holistic insight into the national environment for EdTech, with particular emphasis on policy contexts, challenges, and opportunities. Findings from these methods are presented and discussed separately below, and then integrated and synthesized in the discussion section, which is followed by recommendations.

### 2.1 Key Informant Interviews

Interviews were conducted with leaders and senior staff who worked in roles related to EdTech in government, international organisations, and the private sector, including the Ministry of Education and Sports, telecom industry, the formal education sector, and UN agencies. Interviews lasted between 45 minutes and 1 hour, and covered topics such as relevant or influential policies for EdTech within Uganda, opportunities for and barriers to the growth of EdTech, and key actors and relationships in the field of EdTech. Respondents were also asked information about their role and current activities relating to EdTech. Interviews were conducted in English using online platforms (e.g. Zoom, WhatsApp), recordings of the interviews were then transcribed for analysis. A total of six interviews were conducted from November 2021 to February 2022. Half of the respondents were non-governmental actors (mixed between local and international NGOs), and the other half was comprised of academics and an international actor. The academics in this study were affiliated with public universities.

## 2.2 Documents

The dataset included policy documents, meaning government-produced publications detailing policies, agendas, and/or strategies relating to education, information, and communication technology, and/or digital learning. In total, seven documents were analysed. Documents were written in English and were compiled from web searches and information provided in key informant interviews.

## 2.3 Thematic Analysis

Interview transcripts and documents were analysed using methods of open coding and thematic analysis using Dedoose software, a common coding scheme was used for documents and interview transcripts to allow identification of cross-cutting themes. A total of 18 parent (top-level) codes were used in the analysis, with nested codes for some categories. For example, the parent code of “barriers/challenges” to EdTech uptake and scale-up included within it such sub-codes as “electricity,” “connectivity,” and “economic.”

## 2.4 Social Network Analysis

Using data from the interviews, documents, and additional web searches, we constructed a social network dataset that contains key actors working in EdTech or related fields and the relationships between them. For each actor in the dataset, we collected data on the type of organisation (e.g. NGO, private sector, government), location, and website (where available). For relationships between actors, we collected information on the type of relationships (e.g. finance, advising, collaboration). Results of our social network analysis are presented below.

## 2.5 Challenges and Limitations

While our methods provide a robust and triangulated perspective of the EdTech policy environment in Uganda, it is important to document the challenges that we encountered in data collection and the limitations they entail. First, the participant recruitment process for key informant interviews was challenging at the beginning of the study as the response rate was extremely low. We focused on medium to high-ranking officials, whose views are useful; however, not all of them were sufficiently immersed in the day-to-day ground-level activities and experiences of organisations working on EdTech.

For social network analysis, clear or publicly available information on relationships was often scarce, with websites using ambiguous terminology (e.g. “friends” or “supporters”) to describe their ties to other organisations; however, they do not clarify the role and contributions of that actor in relation to the organisation’s activities. We often coded these links as “collaboration” lacking any more specific information, posing a limitation for the social network analysis and further understanding of power dynamics. Other types of collaborations, such as the use of resources, co-membership, capacity building, information sharing, etc. received fewer specific mentions in websites, interviews, and documents.



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### 3. COUNTRY CONTEXT

Figure 2: Map of Uganda



Uganda, a landlocked country located in Eastern Africa, shares its borders with Kenya to the East, the Democratic Republic of Congo to the West, South Sudan to the North, and Tanzania and Rwanda to the South. The country currently hosts an estimated 920 thousand refugees from South Sudan, 446 thousand refugees from the Democratic Republic of Congo, 60 thousand refugees from Somalia, 41 thousand refugees from Burundi and some 25 thousand refugees from both Eritrea and Rwanda (UNHCR, 2022). The political instability in the neighbouring countries and increasing refugee movements toward Uganda put the government under pressure to provide basic services such as health and education. Despite the challenges, Uganda has been praised as a frontline state for its integrated refugee response that incorporates refugees into its national service delivery. The Ugandan approach has been named the model for the Comprehensive Refugee Response Framework (CRRF), adopted in September 2016 at the UN Summit for Refugees and Migrants (OCHA, 2016). In addition to political and socio-economic challenges, Uganda's vulnerability is exacerbated due to high levels of poverty and high dependence on climate-sensitive sectors such as agriculture, water, fisheries, tourism, and forestry (The World Bank Group, 2021). The country lacks the adequate infrastructure to handle its increasing population, which exacerbates its vulnerability to natural disasters such as flooding, drought, landslides, and climate change.

The government of Uganda considers education as part of the solution to reduce poverty and is dedicated to providing equitable access to quality education to all the learners in Uganda, including the refugees. The education sector is currently struggling with many challenges, including the high level of teacher and student absenteeism, weak school-level management structures, lack of availability of learning materials, and large class sizes (GPE, 2021). Although enrolment rates has been improved in recent years, the primary education completion rate remains at 40% for both girls and boys (UNESCO UIS, 2022). Once students reach secondary levels, those with higher socio-economic status are far more likely to stay enrolled. Rural areas have faced problems attracting teachers, contributing to urban/rural inequities in education (GPE, 2022; UNICEF, 2022). The Education Response Plan for Refugees and Host Communities in Uganda (Ministry of Education and Sports, 2018), highlights classroom shortages as a major issue in providing primary education, especially in refugee settlements. The government of Uganda put more focus on access to education for refugees than on quality, and more than 90% of refugee and non-refugee children are unable to read, comprehend, and divide in the lower grades (Uwezo, 2018).

Uganda has been facing many challenges since the spread of the COVID-19 pandemic as it halted access to livelihoods and basic services in the country, including education. The already existing challenges towards access to quality education have been exacerbated by COVID-19, as the Ugandan government enforced the longest period of school closures worldwide – 22 months – between March 2020 and January 2022. An estimated 6 million children in the lower primary grades (1–3) had missed two academic years by the end of 2021 (UNICEF Uganda, 2021). Researchers found a rise in child and youth pregnancy, an increase in child labour, and predicted nearly 3 years of learning deficits for a majority of students. The pandemic has thus widened learning gaps and exacerbated gender and economic inequities between students (Datzberger, et al, 2022).

Following the ease of mobility restrictions and lockdowns, Uganda's economy has recovered in 2021 as domestic economic conditions improved (World Bank, 2021). However, the country's economy has been challenged once again by the escalation of the war in Ukraine since February 2022, hampering the progress. During this study (2021-2022), we received high interest from education stakeholders in the country to participate in this study, including government officials, leaders and senior staff of international and national organisations, academia, and the private sector.



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## **4. RESULTS**

### **4.1 The Education Technology Network in Uganda**

#### **4.1.1 Key Actors and Relationships**

Based on key informant interviews, documents, and further website analysis, we identified 89 actors currently engaged in EdTech within Uganda, of which 67 have links to other organisations and so are included in our social network analysis (see Table 1). We coded the resulting dataset for descriptors, such as type of actors, for instance, bilateral agency, government, INGO, NGO, private company, and their connections to each other (see Table 2 for actor types and definitions).

International and national NGOs are the most numerous types of organisations with considerable participation from the government, donors, universities, and the private sector. This points to a fairly diverse and heterogeneous EdTech field in which many types of actors are able to participate. The most prevalent types of organisations are INGOs (e.g. Save the Children, War Child), universities (e.g. Muni University, Makerere University), government agencies (e.g. Ministry of ICT and National Guidance, Ministry of Education and Sports), and private companies (e.g. Bridge International Academies, Airtel).

**Table 1:** Actors in the Uganda EdTech Environment and Network

Actor Type	N (All Actors)	N (Connected Actors)
Bilateral Agency	4	3
Embassy	0	0
Government	10	9
INGO	17	12
Intl Org	13	8
NGO	7	5
Other	7	5
Philanthropic Fund	3	3
Private Company	13	9
Religious Org	1	1
School	0	0
University/Research	14	12
<b>Total</b>	<b>89</b>	<b>67</b>

**Table 2:** Type of Actors and Definitions

Actor Type/Descriptor	Definition
Bilateral Agency	High-income country donors (e.g. United States Agency for International Development (USAID), Foreign, Commonwealth & Development Office (FCDO))
Government	National government bodies including ministries and local government agencies
INGO	International non-governmental organisation (e.g. Save the Children, War Child)
NGO	Non-governmental organisation headquartered within the country (e.g. Teach For Uganda in Uganda)
International Organisation	Intergovernmental organisation or an international institution, with stable set of norms and rules meant to govern the behaviour of states and other actors in the international system (e.g. UNICEF, UNHCR)
Philanthropic Fund	Non-profit, non-governmental organisations with principal funds established by wealthy individuals, groups, corporations, or companies to make grants to charitable organisations.(e.g. Bill and Melinda Gates Foundation, LEGO Foundation)
Private Company	For-profit company excluding its foundation, if applicable
Religious Organisation	International and national religious organisation with explicit religious mandate and affiliation
University/Research	Higher education institutions, including universities and research centres
School	Public or private school
Embassy	Embassy of a foreign country
Other	Any other type of organisation that does not readily fit within any of the other classifications

These actors are involved in 122 different links identified in the social network dataset, each of which is coded by the type of relationship (see Table 3 below). Organisations work with one another through various forms of relationships, however, most relationships would be described as “collaborations,” which might include coordinating programmes in a common area or mutual participation in programme implementation, with the caveat that the term “collaboration” is sometimes used in interviews where other factors (e.g. funding, common resources, etc.) are at play but not identified specifically.

Far fewer organisations engage in a single one-directional relationship such as funding, implementation, or capacity building. Some examples of relationships between different types of actors include the Uganda National Information Technology Authority (NITA) (a government agency) donating Information and Communications Technology (ICT) equipment to Makerere University (a public university). And the Ugandan Ministry of Education and Sports (a government agency) alongside Enabel (a bilateral agency), supported the reconstruction and resupplying of four national universities, training lecturers, and supporting the implementation of a national strategy, “Skilling Uganda.”

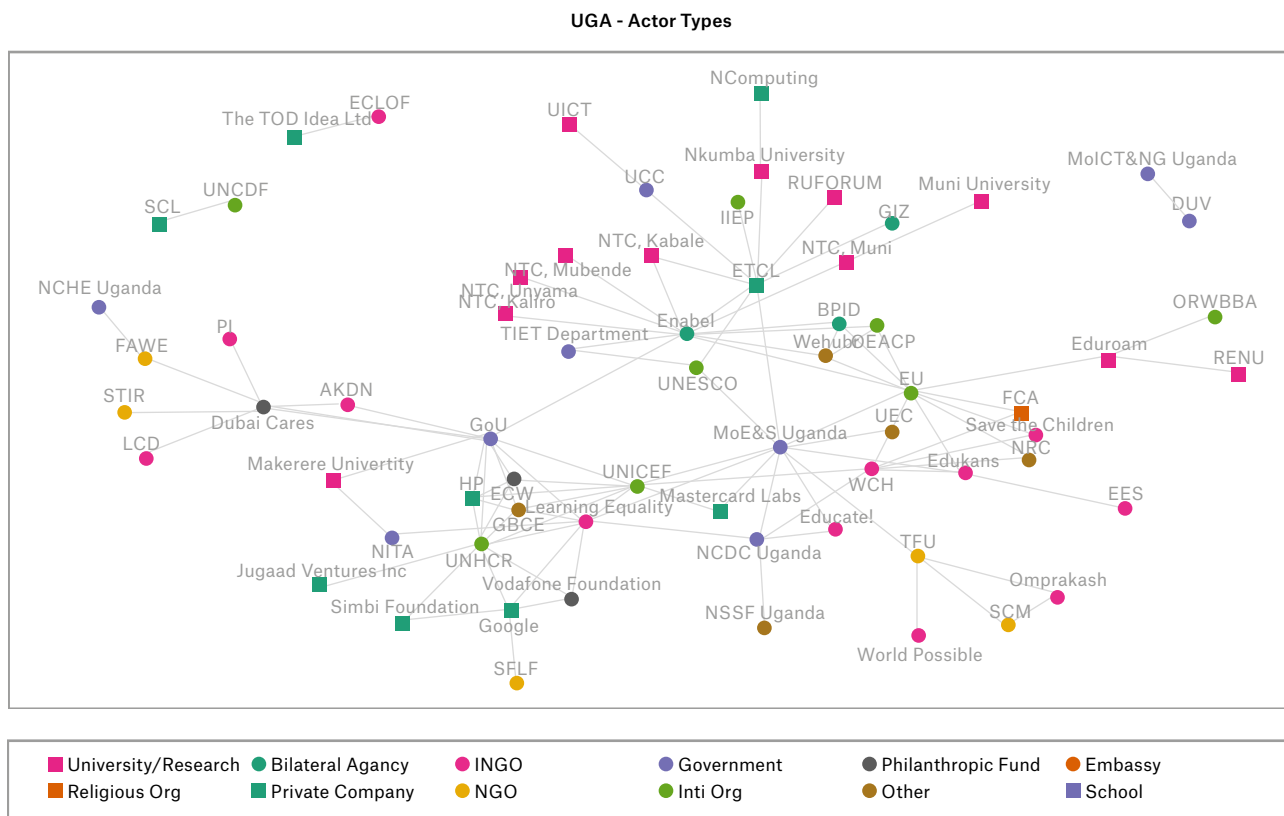
**Table 3:** Types of Relationships in Uganda EdTech Network

Link Type	N (Links)	Percent
Capacity building	7	5.7%
Co-Membership	2	1.6%
Collaboration	66	54.1%
Funding	17	13.9%
Implementation	12	9.8%
Information Sharing	1	0.8%
Other	12	9.8%
Use of Resource	5	4.1%
<b>Total</b>	<b>122</b>	<b>100%</b>

#### 4.1.2 The Network of Actors and Relationships

The network sociogram (see Figure 3 below) shows the EdTech network in Uganda, in which all organisations that are connected in the network are represented as coloured dots and their relationships to other actors are shown by lines. The position of point markers is determined by their connections: actors with more connections tend to be placed towards the centre of the network, and those with fewer connections towards the periphery (Fruchterman and Reingold, 1991). The colours and shapes of the point maker indicate each type of organisation, corresponding to our data collection methods coding 12 types of organisations (with definitions given in the legend below the plot). The figure makes clear that EdTech within Uganda involves many different types of organisations and heterogeneous relationships between them. Several of the more central actors are also clearly apparent (e.g. the EU, Enabel – the Belgian development agency, and UNICEF are clear examples). However, relationships are varied across the network: there is no single actor that dominates it, and in all areas of the network (i.e. local “communities” of relationships) different types of actors are involved. In addition, our analysis shows several clusters within the network, for example, between the funder Dubai Cares and the NGOs/INGOs it funds (e.g. FAWE and Leonard Cheshire Disability, respectively), with links from the funder to the government.

**Figure 3: Sociogram for Uganda EdTech Policy Network**



### 4.1.3 Measures of Network Structure

Sociograms are useful for providing a holistic and cross-cutting interpretation of the network, but measures of network structure can be more useful in providing objective measurements of key network properties. We primarily utilise two measures of network structure: centrality and brokerage. Centrality measures the extent to which an actor is embedded within the network: while many ways of measuring centrality are defined in the social network analysis literature (Borgatti et al., 2018), we use the relatively simple measurement of degree centrality here, which is simply the number of ties to each actor. Brokerage measures the extent to which an actor connects different types of networks, for example whether the government connects an international organisation with local NGOs. An actor's brokerage is simply the count of the number of brokered ties it is involved in.<sup>1</sup> The brokers may connect separate areas and actors of the network economically, socially, or politically, therefore they are the ones to access both valued information and resources (Stovel, Golub & Milgrom, 2011). Brokerage is important because it creates a more varied and less segregated network: actors of different types (and likely with different resources, expertise, capacities, etc.) are working together. Centrality and brokerage are related but distinct: an actor can be highly central but have low brokerage if it is working with only one or two types of actors. Similarly, an actor might have relatively low centrality but be working with many types of organisations and therefore have high brokerage. However, actors with very low centrality (e.g. only one tie) cannot act as brokers.

<sup>1</sup> Brokerage counts can be higher than centrality because it will involve counting ties multiple times. For example, if organisation A (an international organisation) is connected to B (a government actor), C (an NGO) and D (a private company) then the brokerage count from three ties will be four (ABC, ABD, BCD, BAD). This increases exponentially for actors with more connections.

We analyse brokerage and centrality by aggregating the average for each of the 12 types of actors described in the methodology – to identify how different types of actors are positioned differently – and by identifying key individual actors.

Table 4 below includes the centrality measures for each type of organisation, and it shows that bilateral aid agencies, international organisations and philanthropic funds have the highest levels of centrality, however, these actors are not that numerous. Bilateral aid agencies and international organisations also have high levels of brokerage, as does the national government. These results show that international actors are well connected and that they connect different types of actors, while the government has slightly lower levels of connections and also mediates connections between different types of actors. This suggests corresponding levels of influence in EdTech policy and programme. In contrast, INGOs, private companies, and university/research organisations are much more numerous (totalling 33 actors) but their measures of both centrality and brokerage suggest lower levels of influence.

**Table 4:** Measures of Uganda EdTech Network Structure

Actor Type	Centrality		
	Degree	Brokerage	Count
Bilateral Agency	5.7	46.7	3
Intl Org	5.1	25	8
Philanthropic Fund	5	9.3	3
Religious Org	4	0	1
Government	3.9	19.3	9
Other	3.4	0.4	5
Private Company	3.1	8.7	9
INGO	3.1	8.5	12
NGO	2	2.4	5
University/Research	1.5	1	12

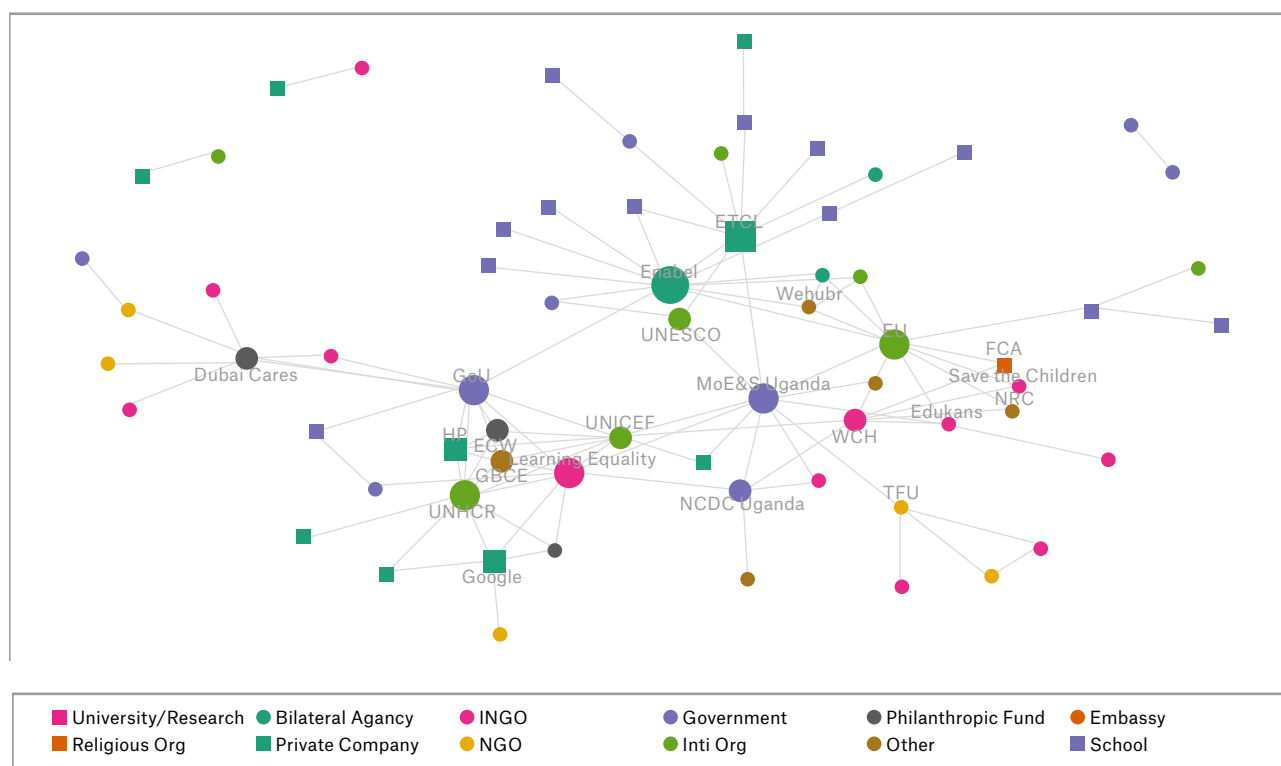
Measures of centrality and brokerage for each actor (Table 5) give insight into the individual actors that drive these trends. A few key organisations are very high in both centrality and brokerage: the Belgian bilateral development agency (Enabel), the European Union, the EdTech INGO Learning Equality, and the Ugandan Ministry of Education and Sports are all shown to be highly connected and therefore likely to be influential in the EdTech network.

**Table 5:** 10 Actors with the Highest Centrality and Brokerage Values

Actor Name	Degree Centrality	Actor Name	Brokerage
Enabel	26	Enabel	140
EU	24	EU	104
Learning Equality	22	MoE&S Uganda	96
MoE&S Uganda	22	Learning Equality	70
GoU	20	ETCL	66
UNHCR	20	GoU	58
ETCL	18	UNHCR	52
UNICEF	18	UNICEF	38
War Child	14	Dubai Cares	28
Dubai Cares	12	War Child	26

These findings are also reinforced by Figure 4 below, which shows the network sociogram, but with the size of points scaled to correspond to actors' level of degree centrality. The top 10% (i.e. 7) of the most central actors are also labelled on the plot.

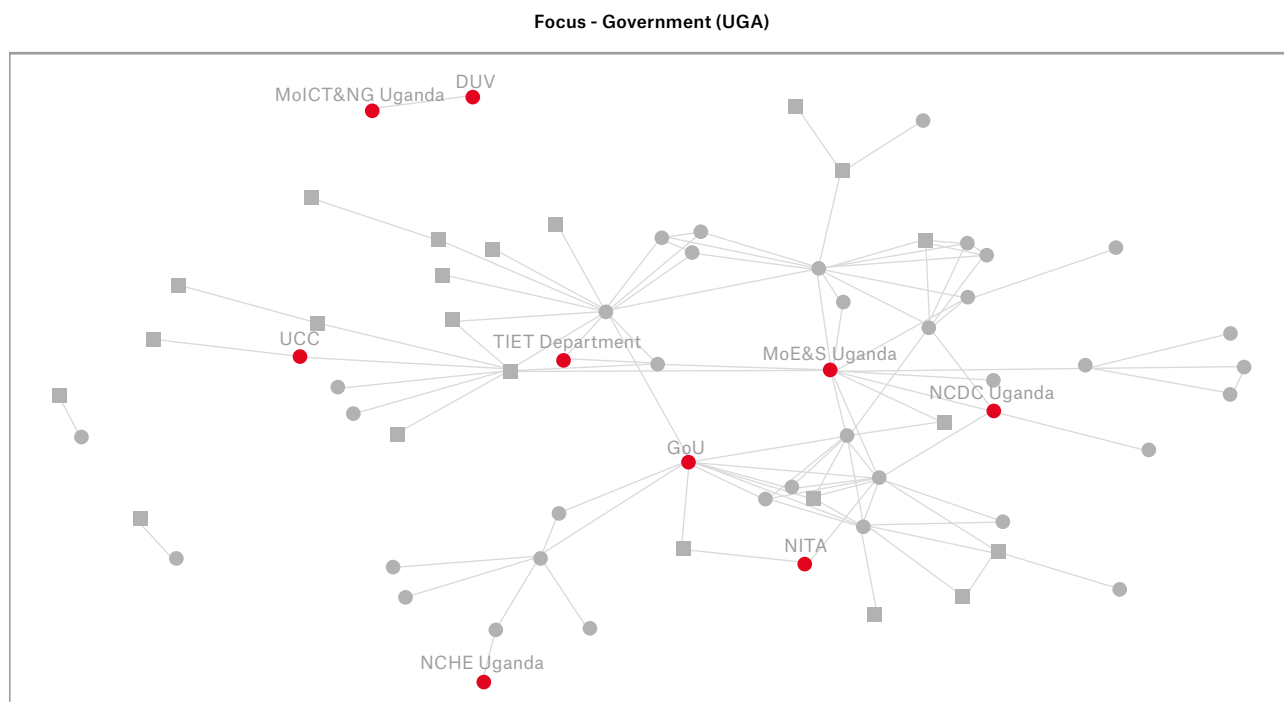
**Figure 4:** Network Sociogram Highlighting Central Actors



#### 4.1.4 Subnetworks and Communities

In addition to the overall measures of network structure, further analysis of subnetworks (e.g., groups of actors or relationships of different types) can yield further insights into the dynamics that are likely to influence EdTech policy and programming in Uganda. We analyse subnetworks by the types of actors involved, and by the types of relationships between them.

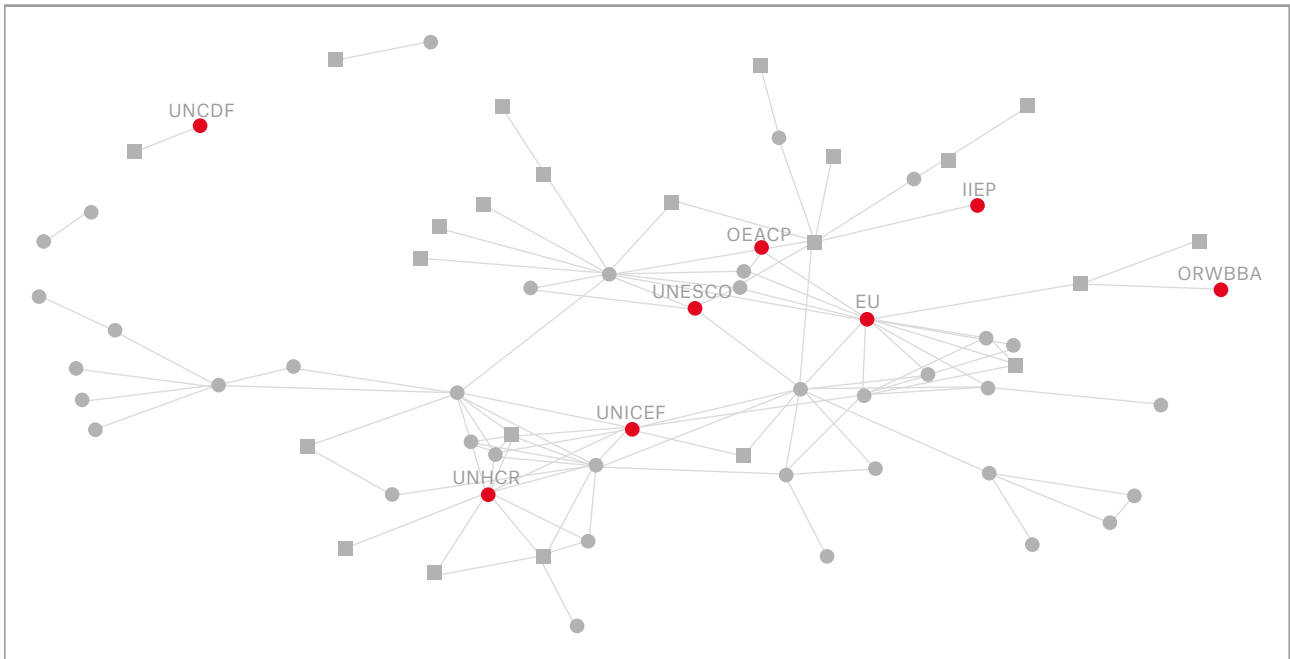
**Figure 5:** Focus on Government Actors in the Network



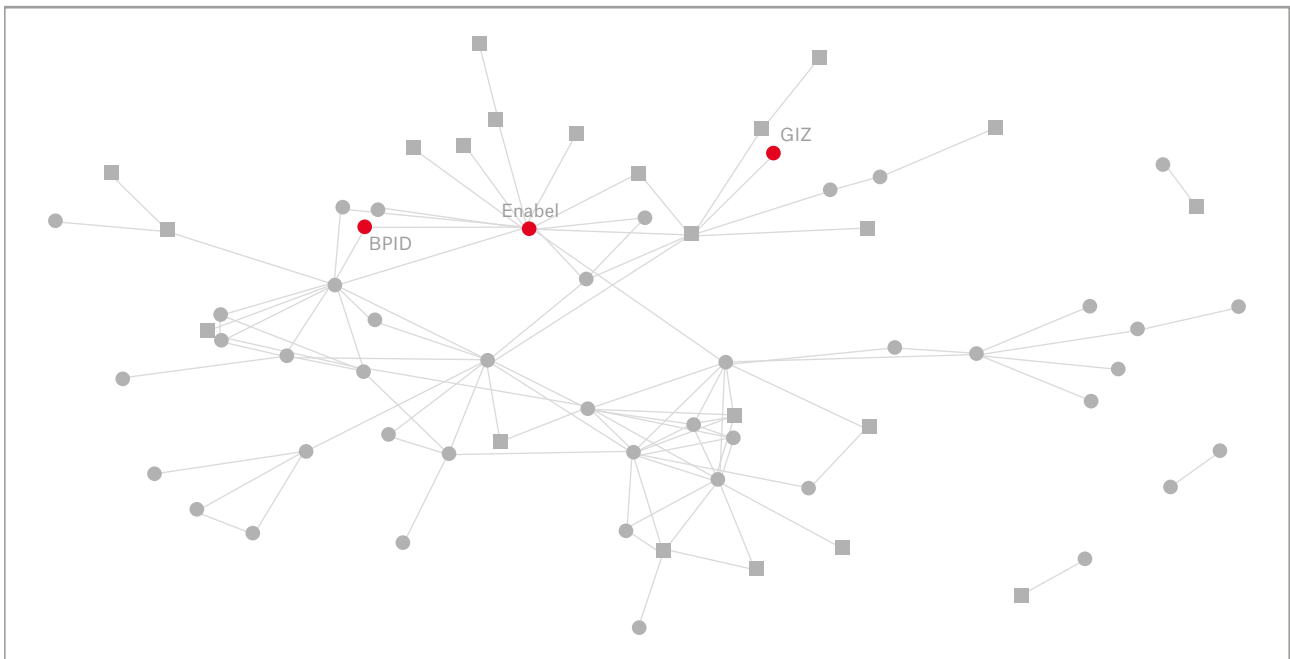
Our analysis shows that national government actors are fairly well-integrated into EdTech policy networks, with the Ministry of Education and Sports holding a central role in the EdTech network, and other government organisations are also involved (see Figure 5 above). However, international actors seem to play more influential roles in the sector. While relatively fewer in number, international organisations (N=8) and bilateral agencies (N=3) hold central positions and are spread throughout the network. INGOs are more numerous (N=12), but they hold slightly more peripheral roles, which is also indicated in the centrality figures given in Table 4. Bilateral agencies, the government, and international organisations are also influential as brokers, meaning that they tend to connect different types of actors. For example, the international organisation UNICEF works with private actors such as Mastercard, the Ministry of Education and Sports, and various international NGOs.

**Figure 6:** Focus on International Organisations (1st figure below), Bilateral Agencies (2nd figure below), and INGOs (3rd figure below)

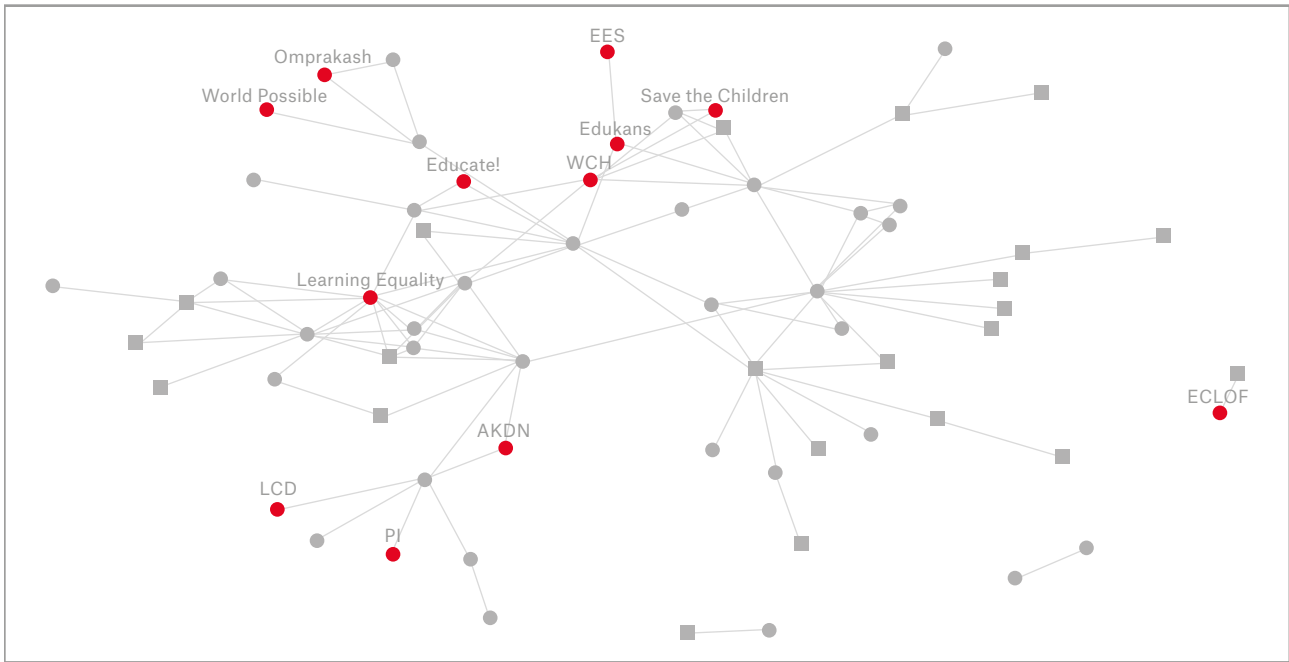
Focus - Int. Org. (UGA)



Focus - Bilateral Agency (UGA)



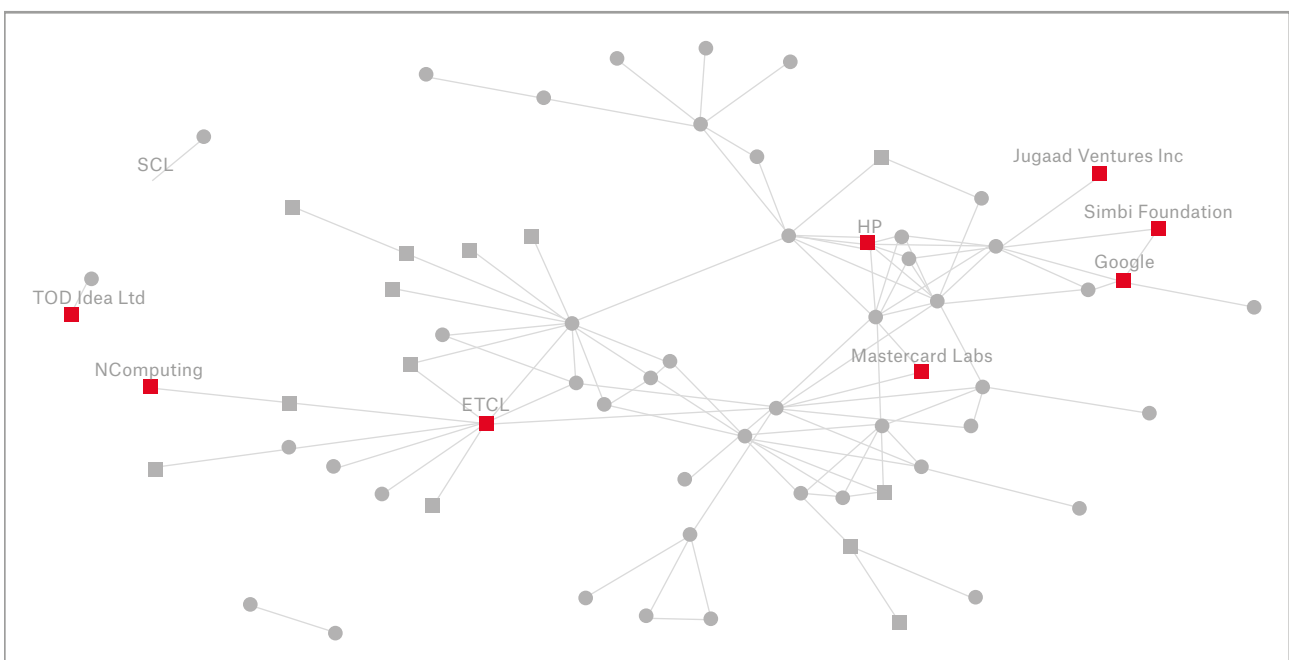
Focus - INGOs (UGA)



In contrast, private sector organisations hold relatively peripheral positions, with corresponding low levels of centrality and brokerage. University and research organisations are also quite peripheral. In both cases, these types of actors are grouped into one area of the sociogram, suggesting that they access EdTech networks through a relatively small subset of brokers (e.g. government organisations and aid donors) rather than cohesive integration. One exception is the consultancy firm ETCL, which is well-integrated within the network through its work as a program implementor, however it is a national private company which is quite different from multinational companies such as Google, HP, and Mastercard.

Figure 7: Focus on Private (1st figure below) and University Actors (2nd figure below)

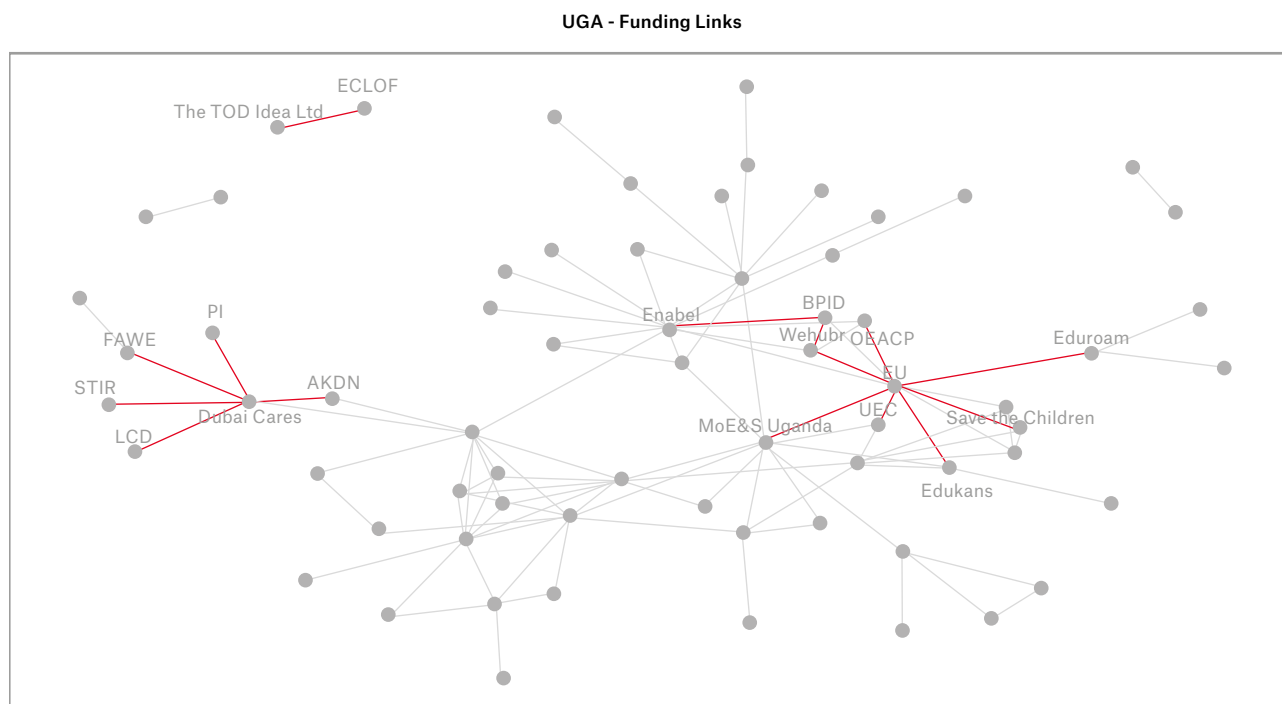
Focus - Private Company (UGA)





Funding is also an important subnetwork, with key clusters around funding from the EU and Dubai Cares (Figure 9), although funding may be present in some links generally described as “collaboration.” The centrality of these funders suggests that they would have an influential role in the network, and that they could shape practice through their connections to NGOs and other organisations.

**Figure 9:** Focus on Funding Relationships



#### 4.1.5 Social Network Analysis Synopsis

Overall, the social network analysis points to a diverse network with the participation of many types of actors. However, international organisations and bilateral agencies tend to hold the most central positions in the EdTech network and connect many other types of organisations, suggesting that the creation of an EdTech policy or strategy within the sector may be led by the international development organisations. However, the national government is also a key player, particularly in linking various types of actors. The network analysis also suggests that a wide variety of heterogeneous actors – primarily NGOs and INGOs, but also religious organisations, universities etc. that are both numerous and less central may collectively play key roles in EdTech programme design and implementation. Thus, opportunities for engagement in the EdTech policy network seem relatively open, based on the diversity of actors who are already participating. Organisations wishing to develop or scale-up activities in the sector could try to establish links with a variety of organisations – particularly the Ministry of Education and Sports and UNICEF – as a way to ensure access to opportunities.

## 4.2 Education Policies in Uganda

The Uganda government has integrated EdTech as a policy area within national policy documents, Ministry of ICT and National Guidance (MoICT&NG) policies, education policy documents, as well as reports dedicated specifically to digital learning. This attention paid across policies shows a potential embrace of EdTech and support to modifying the education system to better incorporate technology throughout schooling and wider society.

For instance, in its *Third National Development Plan – 2020-2025*, the Ugandan government describes a country context ready for technological advancement, including in education:

*“With over two billion Internet users [worldwide], six billion mobile phone subscriptions, and numerous other devices intercommunicating in a vast real-time multi-network, supporting every facet of human activity, ICT is an opportunity... Through use of tele-education, tele-medicine, and e-government, hard to reach communities can now be effectively reached and served in a cost-efficient manner... Given the immense advantages of connecting the population to the internet and to mobile networks, both universal broadband access and complete mobile coverage nationally should become a national priority in terms of infrastructure” (p.18).*

In its *2020-2021 Policy Statement Uganda’s MoICT&NG* describes its mandate: *“To provide strategic leadership and supervision in ICT, Information and National Guidance for sustainable development” (p.4)* which includes ensuring that *“ICT is in the national curriculum at all levels” (p.6)*. The MoICT&NG furthers its commitment to EdTech in its Sector Strategic and Investment Plan 2015-2020:

*“Government has recognised the importance of ICT in the education system, and to this end, the National Curriculum for Higher school of Education has been reviewed to include ICT as a compulsory discipline. In addition, computer as a subject is examinable at secondary school level. More needs to be done in schools starting with pre-primary education, primary level all the way to tertiary institutions in order to consolidate this.”*

*Uganda’s Digital Education Agenda 2022 – 2026* provides the most comprehensive review of the country’s EdTech strategy, and the fact that Uganda has developed such a detailed document reflects its commitment to and organisation around embedding technology into its education systems, supported by a group of stakeholders. For instance, a respondent explains: *“UNESCO provides the technical guidance and the development of this digital agenda strategy, which is being developed by the ministry, led by the ministry, academic institutions, including universities, professionals in the IT, including the National Technology Authority in the country, the private sector, and UN agencies, and development partners. So, what they are doing is to bring in technical expertise from the various sources to be able to develop that strategy.” [Respondent #3].*

The Strategy document states that: *“The Digital Agenda for the Education Sector is the first concerted flagship initiative of the Education 2020 Strategy for Smart, Sustainable and Inclusive Education in Uganda” (p.18)*. The document explains the embeddedness of EdTech within broader national policies, noting that it is *“aligned to the National Development Plan (NDP) II1 and NDP III which advocate for human capital development in the Sector leveraging on the ICT use and penetration resulting into improved quality learning outcome”* and proposes that *“interventions are designed to embed ICT more deeply across the system to enhance the overall quality of Uganda Education” (p.vii)*.

*The Digital Education Agenda* includes bold policy goals, including: *“by the end of year 2026, the following outcomes shall be achieved: (i) 50% digitally literate citizenry, (ii) 50% of industry skills requirements addressed” (p.viii)* and the *“development of a high-performing digital education ecosystem/ environment that facilitates the use and development of smart ICT solutions in Uganda facilitating most sectors such as health, engineering, security, economy, banking, environment, and agriculture. The ultimate*

goal is to increase Uganda's economic competitiveness in line with the Vision 2040, the well-being of Ugandans through job creation and others, and the efficiency of public administration at both local and central government levels" (p.19). The *Digital Education Agenda* lists a series of ambitious objectives such as "To increase coverage and access to the ICT infrastructural and connectivity in the Education sector... To develop an integrated direction in which ICT shall facilitate teaching, learning and management of service delivery in education sector {streamline, review, rationalise and harmonize the fragmented ICT initiatives}" (p.37) among others.

Although not a primary policy document, a useful secondary source on Uganda's EdTech policy goals is the 2019 document *Mapping EdTech in Uganda* produced by the Uganda EiE working group, which provided a stakeholder mapping to inform the *Digital Education Agenda*. It describes EdTech within Uganda as "seen as both as a way to develop digital literacy and drive overall (economic) literacy" and explains that "EdTech is expanding quickly through a lot of small-scale solutions by Ugandan social enterprises and NGOs across the country... In addition, with a growing interest from the Government of Uganda to invest in an ICT-enabled economy requiring an ICT-literate workforce" (p.4).

Despite EdTech's embeddedness within Ugandan national agendas, the *Digital Education Agenda* recognises the challenges of implementing the education policies, explaining such barriers as "Inadequate ICT infrastructure and connectivity; Inadequate Digital skills sedimented by low levels of innovation among the youth; inadequate Legal, policy and Regulatory frameworks for ICT; inadequate Data Management and protection protocols; and Inadequate Inclusiveness of persons with special needs, there opportunities identified that can be capitalized on to enable implementation of priority objectives to success" (p.36).

Respondents echo such concerns; although policies have been written and the government supports EdTech, implementation poses a challenge: "The biggest challenge we have, we have very good document developers. We develop very good documents, but when it comes to implementation, that is where we have a problem. The actual implementation does not always go right. [Documents are] clearly spelled out, but what is on ground to be done is different, that is the biggest challenge we have and all goes back to the implementers on ground. Are they really following what is supposed to be followed, I think that's where we go wrong." [Respondent #4]

Another respondent discusses the policy implementation barriers: "So, I read it, yes, it's the good one, when you look at it, it's a very good one, but it all comes back to connectivity, it comes back to access to electricity, it comes back to access to devices. And in the end, you'll find that it automatically begins to bring the inequality divide: those who can afford and those who cannot afford. And for those who cannot afford, like in the refugee centres or in other upcountry places, it would mean that, you know, an NGO has to support that system. But how sustainable is it?" [Respondent #6]

## **4.3 Barriers and Challenges to EdTech in Uganda**

### **4.3.1 Political Will and Governance**

Several respondents noted that despite a readiness among stakeholders directly involved in education, higher levels of government have not shown adequate political will to implement what is needed for robust EdTech programmes throughout the country.

One respondent mentioned the need for the government to strengthen internet connectivity in order to enable EdTech: "I think where we are now, we cannot run away from digital technology, we cannot, because truth be told, we are in need, we can't run away from it, but we need the consensus building on

*this. Government needs to appreciate it and put it as a top priority, as an agenda... we need that kind of political support and prioritization of connecting the country to internet first, then other things can follow.”* [Respondent #6]

Another study participant described the lack of public funding as directly impacting EdTech expansion: *“the government is always looking around and seeing what is happening globally and the technocrats know it. But it’s just there’s no money to invest in, they are not investing. So, they know what is to be done, it’s just they don’t have the political will from above to put the funds towards it.”* [Respondent #1]

The respondent further explained that the government might be abdicating responsibility because the many NGOs can take on the EdTech work: *“So, I think my observation is that perhaps having more NGOs also kind of disincentivises the government from doing its role sometimes... sometimes when government sees that the NGOs can do this kind of work, then let’s put the resources elsewhere.”* [Respondent #1]

And even when there may be political will, governance issues and political conflict impact the capacity to implement EdTech: *“Yes, politically, there are people who are willing, but they are not moving together. When I give an example, in Parliament, whatever an opposition parliamentarian comes up, it is very difficult for the other party to buy in, because the idea is coming from a different one. So, like that, it’s like when two elephants fight, the grass suffers. So, politically, they are not very agile and responsive to supporting the education of the children.”* [Respondent #2]

This respondent goes on to explain the absence of political collaboration needed to face educational challenges: *“there must be a strong understanding or collaboration with the government in order to ensure that the program is brought.... So, the bureaucracy has always been quite long, which is a challenge.”* [Respondent #2]

Nepotism presented another concern connected to the issue of politics and governance: *“when it comes to like, of course, the educational technology infrastructure, it needs maintenance as well. And when it comes to maintenance for sustainability, they would put maybe people who they know, because if someone is put in a position as a maintenance person for either IT infrastructure or something like that, the person gets a job. With the job, the person gets money, and quite often, they misuse that position and their position in order to get a person in that role, a person who is not well qualified, just because the person is related.”* [Respondent #5]

### **4.3.2 Economic Constraints**

Respondents mentioned economic barriers and finances as presenting a key challenge to EdTech uptake and scale-up. An interviewee explains the declining public budget for education: *“there’s no money for this... the education budget for Uganda has been declining, the national budget has been declining since 2010. And as we speak, we have the national budget supposed to be about 20% of the national budget, we are now at about tickling around 10. This year it was about 10.5%. When they finished in June-July, it was about 10.5%. I can share that information with you after. This means that [this is a] very underfunded public education system, which means technology is not prioritised.”* [Respondent #1]

The MoICT&NG ICT Sector Strategic and Investment Plan 2015-2020 states that *“there is gross inadequacy of ICT equipment, ICT infrastructure and teachers for the subject”* (p.36).

EdTech programs thus far, even those that might be viewed as successful or potentially effective, have predominantly targeted a small number of students. To scale up and reach most students (including those most marginalised), the financial commitment to education would make a difference:

*“The key challenge is that it’s a program that has not yet been really invested into, and we have currently over 15 million children who are of school-going age, and when you look at these few programs that are already running, they are only meant for a few specific children.” [Respondent #2]*

*“There are communities that we go to, and you find over 200 kids in one classroom, and they are not splitting groups, like the teachers are firefighting. Like a room, like this one where I am, 200 [kids] on top of each other. Some they even have to take them out into it because (1) the structures are not enough to support them and then (2) I couldn’t share with you, it’s a tough one, sometimes they take them to go and learn under the trees, because someone is like, “how am I going to manage to teach these kids” so they split them, some stay in the classroom, some go under the tree. If it rains, then they come back to the classroom. If it’s not raining outside, then they try and they tie the black board up outside.” [Respondent #1]*

A respondent described the financial burden on teachers: *“The challenge is that there are no resources. Say if I’m a teacher, and I’ve been teaching in this, and I want to go back, this is the time that I can do it and I have maybe a scholarship or government is [paying] my bill. It’s up to you, the individual teacher, because you must meet your qualification and upgrade, and you want to stay in the system, then you must do that.” [Respondent #1]*

Financial barriers directly impact the possibility of scaling up, leaving EdTech initiatives as short-term projects: *“You are able to implement as long as you have money, so that’s why we go, it is a project, you come at a project level, not at a program level. It could be two years, it could be three years, could be five years, but there’s no scale up because of the funding. [Respondent #6]*

The cost of the internet present a major barrier:

*“One of the most unique challenges is the high tax on internet. The internet is quite expensive in Uganda, and to make it worse, the taxes were introduced during this school closure period, when people are economically stricken down and you expect them to make their children attend online lessons with high internet prices. So, that is quite unique to Uganda.” [Respondent #2]*

*“They need to reduce on the cost of internet. Internet is very expensive, they need to reduce on the cost because now, internet is by private companies. So, they charge as they wish, they are businessmen, anyway.” [Respondent #6]*

Some EdTech initiatives with promise have only be piloted in private schools that can afford them, thus potentially exacerbated socio-economic inequities: *“This is the biggest thing; these [EdTech products] were mostly accessible to those people who could afford. But those ones who could not afford, it became more of a challenge. So, to me, I actually felt that it probably wasn’t helping quite a lot to many of those who could not afford.” [Respondent #4]*

Respondents noted that scaling up EdTech would require financial commitment beyond the national government, including international donors: *“In terms of resources, who is going to finance the ultimate ICT in education, since it is going to be huge, and it’s going to be costly. So, the government, of course, through this tax paying system, will do, but how prepared are other private sector and other development partners coming in to ensure that these gaps are addressed?” [ Respondent #3]*

According to a respondent, despite relative stability, Uganda has faced the potential for security issues, both within the country and from outside its borders. This indirectly impacts education funding due to public budgeting being redirected to security in order to address national and regional security issues: *“For instance, when you look at the budgets when they come out of parliament and the bills that are passed, you see that. The current government has more unclassified money or funds tied to security. Yes, we tend to be the most stable country around East African despite what’s happening now*

recently during Covid and past, but we tried to pacify Somalia, the DRC, now our friends in in Ethiopia, Eritrea, so we tend to be more of trying to pacify or make peace around all these countries, and we spend more money there.” [Respondent #1]

### 4.3.3 Electricity

Respondents noted that a lack of electricity across the country would make EdTech scale-up very challenging: “we do not have electricity all over the country, so many of these gadgets especially those which you would use it at the institutional level they need constant access to what to electricity or supply of electricity... some have tried to use solar yeah, with which would be the really the best option to go in terms of the many areas that do not have electricity, but solar installation costs are also expensive, which many rural schools cannot afford and then you get the Communications Commission has tried and also to try to establish computer labs I know in schools, in up country schools, especially those which have access to the main grid electricity, but those which are off grid, it’s still a challenge really.” [Respondent #5]

Another explained: “We have some places where we do not have power, it is a fact, and this is an impediment to adoption.” [Respondent #4]



@War Child/Uganda/Michael Jessurun/2019

#### 4.3.4 Connectivity

Similar to electricity, only a small population has internet connectivity. According to the 2022 Digital Education Agenda notes the issue of “Inadequate Digital Equipment and Connectivity in the Formal Education Sector Digital Skills development is hampered by inadequate ICT infrastructure (equipment, software and connectivity) at all levels of the education system” (p.5).

A respondent noted that: *“our internet connectivity in this country is very poor. So, software in fact, even if you wanted to learn, you can’t access, you have to be in Kampala or in one of these city centres so that you can access, is it in platform, or is it in internet providers in the different communities. So, that is a big challenge.”* [Respondent #6]

As discussed above, the cost of internet presents a barrier for many:

*“internet is very expensive even for those of us who can afford it, we feel it, it’s quite expensive. So, if for us who can afford it, we feel the pinch, what about for that family, that even placing, you know, bread on the table, is a challenge? So, that means it will only remain for the haves, and the have nots cannot access it.”* [Respondent #6]

*“internet is still very expensive within the country, so acquisition of internet to be used for online learning is still an impediment to adoption.”* [Respondent #4]

Moreover, even when accessible, the internet connection is unreliable. As a respondent described:

*“when schools are reopened, the country decided to orient teachers on the abridged curriculum... [For] most of them (teachers), this was the first time, there was a lot of excitement about it... And I would believe that the timing wasn’t enough, because they would hold it for a whole day, they’re all there, they are glued on their screens, some of them are using phones, then the internet cuts off, then they have to come in, they’re losing learning time.”* [Respondent #6]

#### 4.3.5 Devices

The Digital Education Agenda 2022 – 2026 states that: *“individual learners and teachers lack access devices for remote learning and teaching respectively”* (p.5). A respondent presents an example: *“Let’s take an example, our computers. Certain schools cannot afford to have even a computer in their school, even for the headteacher.”* [Respondent #4]

Another respondent explains how this lack of devices impacts learning in higher education: *“In some areas where there’s a challenge for either access to the infrastructure or the ICT resources, they would teach the subject of ICT or computer science, but it would be in theory. In one class, which I taught one time, because I wanted my students to go to the computer lab and use their computers for reading, and these were teacher trainees, and they told me ‘But Madam, we have never touched a computer.’ Some of these students had passed through A level, advanced education level, and they have passed through schools where they had computers, but then, they were taught in the theory. Reason? Either the school did not have computers, or the computers were down because of I don’t know, virus infection, or no maintenance, or because of electricity costs, things like that. So, they would leave it, and they just teach in theory.”* [Respondent #5]

### 4.3.6 Digital Divide

A stark digital divide in Uganda means that EdTech initiatives in the country have thus far predominantly benefited higher-income classes: *“the socioeconomic political mix leaves everyone in a dilemma. Economically, people are not doing well. The rich are richer, the poor are poorer, and there are people who have, of course, benefited a lot from this school closure and lockdowns because of their own ways of getting money, and yet millions and millions of people do not have that privilege.”* [Respondent #2]

Respondents provided examples of digital inequities:

*“The kids who have high income and they live in Kampala, for example, the capital city, and have the money, they go to British international schools, US international schools, so they get access to all that. Then the kids of low income, who are the majority, right, since they are like 80% of the population, they have to wait until they get to university to get access to such. So, they are way behind their counterparts.”* [Respondent #1]

*“The challenge is that then because the majority of our parents are very rural and also very poor, and again, less funding for public education. Remember that the continued reduction of public funding for education, guess what now, and more children coming. There is mushrooming of private school owners, so education is a private enterprise, right now. But it’s expensive. So now, why we can’t provide that EdTech, it is expensive. So, for you now, an average Ugandan, to take your child to a school community that places priority on EdTech, run by technology, you must pay a very, very big price for that. So, then there is that... So now you have two, a tale of two countries. One that thinks of where we go to get the right education, the right tools, and the gadgets, and then the one that always looks to the other and says, ‘I wait for your breadcrumbs and share with me.’”* [Respondent #1]

### 4.3.7 Geography-Urban/Rural Divide

The digital divide in the country largely aligns with geography; those in urban centres have far better access to EdTech than those in the rural regions: *“I think one of the things that has been coming and might be heightened is the digital divide in terms of rural and urban setting, because while the opportunity might be better for those who are in urban setting, it’s not the same for rural.”* [Respondent #3]

A respondent discussed an EdTech initiative during the COVID-19 school closures: *“That [EdTech initiative] went well, I think, with many educational institutions which had maybe mostly urban-based student population. But those students who came from rural areas, where the majority of our learners at the secondary school come from, even for the universities like the one we have, many students come from rural areas where we have challenges with the electricity, with access to gadgets. They tried also to use radios and television. There were some teachers who were selected, and I think they got some bit of training to teach selected subjects over the radio, and some of them were originally done so that they, the students, could make use of at least during the lockdown time, they could at least have some learning. So, what I know at the primary level they had those ones radio and the television, but of course, radio, was expected to be more widespread, which is the case in Uganda, but television is not really very widespread in Uganda because some rural areas really, we do not have electricity all over for a television to work and for students to have benefited from that kind of educational technology use... I think I see the need here in terms of addressing the different needs across different regions all over Uganda since the access is very partial it seems like some areas get more access whereas others get less. The urban areas, they tend to have it a little bit less challenging in terms of infrastructure. Urban infrastructure in itself easily supports the use of technology. But the rural places, really, they do not have that much, and the majority of the Ugandan population is rural.”* [Respondent #5]

During COVID-19, a respondent explains: *“Even when people talked about digital learning, yes, during the digital era, this year, the last two years, it’s only schools that had these platforms that were able to teach children and their children were able to access. And these were all mostly in urban centres. So, the children, the marginalised child who is in the countryside, was not able to access this.”*

**[Respondent #6]**

Respondents further echo the barriers for rural populations:

*“Look at the remote areas are not left behind considering their uniqueness and their deprivation imposed by a lack of facilities, infrastructure, and a low level of adaptability. So, those physical and infrastructural challenges, including electricity, will need definitely to be addressed... The challenge will mean that there will be need for more resourcing to be able to reach even the farther areas inside alluded to at the beginning, the digital divide. The digital divide, in details, will include limitations that are imposed by, among others, accessibility, or inaccessibility due to physical constraints, including limited technology, limited access to power source, fibre and network connectivity, remoteness in terms of infrastructure. So, I generally put it that it will likely to be a challenge and cause divide.... will look at the remote areas are not left behind considering their uniqueness and their deprivation imposed by a lack of facilities, infrastructure, and a low level of adaptability. So, those physical and infrastructural challenges, including electricity, will need definitely to be addressed.”* **[Respondent #3]**

*“The only challenge is how can it reach everyone, and no one gets left behind? It’s the biggest question, because when you look at the rural setup, the technology can’t reach there if it is Internet-based or networked what about where the refugees are settled, and the services don’t reach them that becomes the biggest concern of everyone or the biggest question that everyone is having at the back of their mind right now.”* **[Respondent #2]**

*“They’re trying to expand the National Grid, but it was still not reaching many areas. Unless, where it passes, villages where it passes, towns where it passes, yes, and most of it is going to remain in the urban areas in the upcountry places, where it moves. So, using solar panels, radios, solar related technology, to support the use of educational technology, will expand it into rural areas. I think many people in rural areas would be excited about making use of resources which otherwise they would not do. Even use of like their smartphones, if you go in a village context, you hardly see a smartphone.”* **[Respondent #5]**

#### **4.3.8 Low Technological Skills Capacity**

The Digital Education Agenda presents the following barrier to EdTech uptake: *“Low Digital Skills Capacity in the formal education sub-sector to foster digital skills”* (p.7).

Respondents lamented *“local capacity of teachers to train, to teach children”* **[Respondent #6]**.

*“I think one of the issues here we are really talking about is the skill base of the teachers who are really a key in using educational technology.”* **[Respondent #5]**

An interviewee shared the belief that a majority of teachers are *“ICT illiterate, and therefore, we need to do quite a lot in training to get them literate before they can start using these education technologies to teach their students. We noted that when it came to COVID, when even many of them just even having an email address was a problem, it’s not even at the primary and secondary level, even at the tertiary level. We are seeing students who can tell you that when my phone was stolen, even my email address was stolen. And we just really wonder what is happening here. So, capacity building is another issue that we need to quite do a lot.”* **[Respondent #4]**

A respondent explained the problem of teacher capacity due to lack of familiarity with digital technology in general: *“capacity of the teachers to run EdTech... comfortably or conveniently, they lack that. Bringing from experience, teachers in Uganda used to fear computer first of all, because once there was something that happened to their salary, they would tell them the computer has deleted your name,*

and they started fearing computers like that. Even currently ATM machines, the ATM for the cash points, once they go there, they'll want to seek assistance of the guards who are there, and that's how they get cheated. So, that fear needs to be removed by strengthening their capacities, capacity to run EdTech is still very weak in Uganda." [Respondent #2]

Another described: "even our teachers are not yet ready for digital learning. I was able to observe in my own home, they teach children like they're teaching in a normal classroom: [for] one hour, [the] children are seated, listening to the teacher on the screen. Children's learning capacity span is not that long. Even in a regular school setting, they have breaks, they have time to do other activities. But remember this, the teacher is doing that. Very few teachers are able to hold breakaway rooms to allow discussions. So, those are some of the gaps in the digital learning that I noticed... the competence of the teachers to prepare these learning materials, that's one." [Respondent #6]

The low technological skills capacity issue impacts schools country-wide, but rural communities are the most affected: "the skills base, because the country is still at a very low level of uptake or educational technology with many people, especially in the rural areas, struggling to be literate in terms of ICT." [Respondent #3]

#### **4.3.9 Cultural and Attitudinal Barriers**

Cultural beliefs and norms act as barriers to accepting EdTech as an important aspect of education. In terms of teachers: "I think one challenge really that deserves to be mentioned is the attitude of people in using technology in general... I think one quickly realises that the teachers' attitude to using technology, because you may teach or train the teachers in using technology, but when they do not change the attitude that, for example this is maybe I learned how to use technology during the COVID lockdown and now that there's no lockdown, I will not use it, and indeed there were some organisations that tried to train Ugandan teachers to use technology during the lockdown and they saw that they can support the teaching and learning process during that lockdown, but that attitude remains. Recently, I had someone who told me 'we know these things, you taught us how to use the technology a long time ago, but we did not make use of it until when COVID came, then we realized that we needed to use technology.' So, that kind of attitude is really still there, which also needs to be to be changed." [Respondent #5]

Many schools have yet to embrace EdTech as a viable learning tool: "Then there's the culture. Many of our education institutions feel that online learning is something that is imaginary, it cannot really get students to learn the way they are supposed to learn, which is not true. They feel that it's taking away the authority of the teacher, and therefore, it has to be shunned and leave the teacher to have the authority. Many of them are still within the teacher-centeredness, forgetting that there is already a paradigm shift into the student-centeredness. So, the culture is an impediment in several of them." [Respondent #4]

Communities and parents also hold beliefs that may not support the introduction of educational technology: "Otherwise, in the lower community, where the programs are implemented, most times, it receives a very huge resistance if they don't know any program. They want things to be run the way they it was earlier." [Respondent #2]

#### **4.3.10 Poor Localisation**

Some of the EdTech initiatives that have been implemented in Uganda have suffered from poor localisation: "some of the programs are not localized, that you have many of these foreign people are more into the actual running the programmes and rather than the actual implementation. When it comes to end, when the project has ended and they have to go away and all that, it has not really been localised and taken up by the schools or community. In the end, it sort of also loses focus, and the next thing is dead. That's another challenge I can see somewhere." [Respondent #4]

Another respondent describes: *"I'd say late 1990s up to the first decade of the 21st century, there have been organisations, international organisations, including World Bank that have been trying to support Uganda in trying to increase the resource base infrastructure for using technology in education. So, that is an important aspect because without those resources, even if the teachers somehow learn to use them, maybe when you invite them to train them in a centre, which is what happens actually, with their retooling, they take the teachers or selected teachers from schools usually that's how it is done they invite selected the teachers from schools gather them in one place, mostly in the central areas at the regional centres or in Kampala, the capital city, and then they train them. So, when they go back, if the resources are not there, then it becomes challenging just be theory."* [Respondent #5]

## 4.4 Opportunities and Key Drivers for EdTech in Uganda

### 4.4.1 COVID-19

Despite the obvious devastating impact of COVID-19 on the education and general well-being of Uganda's students, several respondents noted that the pandemic school closures opened many stakeholders' eyes to the value and opportunities that educational technology could present. And so a silver lining to COVID may be that it will become a key driver behind increased Edtech uptake in the country.

According to a respondent: *"Initially, Uganda used not to recognise it so much, it wasn't a familiar methodology or approach or strategy for learning. But as COVID brought in new ways of doing things... It has been facilitating learning, especially for children of lower grades, their learning in terms of literacy and numeracy."* [Respondent #2]

Other respondent statements echo the significant of COVID-19 for advancing an acceptance of EdTech in Uganda: *"It's COVID that has pushed everyone to the corner for them to understand that digital learning is possible and recommended. No one is against it."* [Respondent #2]

*"The COVID lockdown has been unique. Not only unique to Uganda, but an opportunity for Uganda, because Uganda was really one of those that ignored, I think, for long [time] [the] use of educational technology."* [Respondent #5]

*"There's no any other time that has brought this into life than the COVID time. For me, I tell people sometimes that since 2007, I've been singing the song of adopting education technologies and many people do not listen to me, but I was blessed by COVID, which came in, and helped a lot of organisations to adopt."* [Respondent #4]

COVID led those who may not have been initially supportive to embrace EdTech: *"Now, however, with the coming of COVID-19 and everything being shut down, it is now the technocrats at the Ministry of Education who we are working with, are starting to think okay, we need to move."* [Respondent #1]

Although a digital education strategy was discussed prior to the pandemic, respondents note that COVID solidified and contextualised many of the components of the agenda: *"I think COVID now gave an opportunity to try to put in context some of the issues, or some of the things that they want to consider. So, a lot of things were done during the COVID to try to ensure continuity of learning, using virtual means, and using other remote mechanisms with support from partners, including UNESCO, UNICEF, and the other development partners, and ENABEL, the Belgian government. So a lot of the things that came at the COVID time basically was to ensure continuity of learning, but it provided now resource to develop fully the agenda, the digital agenda strategy..."* [Respondent #3]

#### 4.4.2 Readiness of the Government

The data indicate that although some government actors or branches may have not committed adequate funds to education, other state actors are ready to embrace EdTech moving forward. As the MoICT&NG Sector Strategic and Investment Plan 2015-2020 explains, the Uganda “Government has recognised the importance of ICT in the education system” (p.28). Interviews echo the government’s commitment to and readiness for a scaling up of EdTech across the country: “No one is against it... everyone is positive about it, and they would wish it reaches everyone on the ground.”

[Respondent #2]

Further denoting the government’s readiness to support EdTech, the Digital Education Agenda states that: “An analysis attests to the fact that the government has a high commitment to improve the state of education in general and also recognizes the role that ICT can play in development and in education and sports. This is evident in the various policy documents and national plans. A number of initiatives have already been taken. There is also recognition that ICT can be used in the in-servicing of teachers with efforts being put in place to use emerging and alternative technologies in order to reach those in isolated locations. This is proof that ICT is seen to have the potential to address the challenges that plague the education and sports sector” (2022, p. 13).

Along with its willingness, based on the findings above as detailed in the social network analysis, the government could feasibly act as an effective bridge between EdTech stakeholders as a broker with many established relationships, and the capacity for fostering partnerships.

#### 4.4.3 An Existing Digital Education Agenda

That Uganda began to develop a concrete agenda relating to digital learning even prior to the pandemic further reflects a commitment to integrating and scaling up EdTech throughout the country, as it states: “The proposed interventions are designed to embed ICT more deeply across the system to enhance the overall quality of Uganda Education and Sports” (2022, vii).

The Digital Education Agenda includes a five-year plan, targeting all levels of education, that includes stabilising and growing ICT infrastructure, the development and promotion of various services and programs, and technology skills development for students and teaching. Such a comprehensive policy document so narrowly targeted to EdTech indicates a readiness to embrace a variety of interventions and products.

Although some respondents questioned whether the agenda could be effectively implemented, the document is thorough and attends to the potential barriers, providing a realistic outlook on EdTech uptake.

#### 4.4.4 Actively Addressing Skills Capacity

In addition to an ICT skills training agenda outlined in the Digital Education Agenda, Uganda has already begun to provide professional development opportunities for teachers to strengthen their EdTech skills. As a respondent explains: “The best, I think, they [the MOE] did was to start selecting some teachers, I think, it was one teacher per government school for that matter, to be “retooled.” The word they used was “retooling” in the case of technology, and those teachers would then go back to their schools and be the ICT teachers teaching, because in the O level and A level syllabus we have subjects, one is called “computer science” and the other one is called “ICT.” So, the teacher students take those, and then those ICT teachers would then teach those subjects.” [Respondent #5]

Therefore, although low technological skills capacity was described as a barrier to EdTech, that a programme is already in place to support teacher training in ICT reflects a positive development.

#### **4.4.5 Potential for Solar Energy**

Although remote communities face the challenge of adequate access to electricity in order to use EdTech effectively, respondents noted that solar energy might present a solution:

*“Karamoja is often given as an example of one of the remotest places in Uganda. The people there are pastoralists and cattle keepers who take care [of animals]; they are more interested in taking care of their animals than in other things, although they have changed in the meantime.... So, I think maybe the opportunity in this area would really be in terms of infrastructure, would be to make use of Uganda’s sunshine, to have solar systems, solar-based systems that can be used in those areas. Like this one laptop thing, they use laptops that whose batteries last long and can be charged by the solar, or if it is in a lab, you can establish something which is based on the solar system, that is possible.” [Respondent #5]*

*“Uganda has the benefit of having sunshine throughout the country and throughout the year, most part. So, most of the schools are embracing solar system or solar based power options, which worked well. We know very many radio stations and televisions now using that as a power source. So, institutions including the schools may opt to take advantage of the weather and the natural terrain to embrace solar options as an alternative source of power as compared to using the hydroelectricity, which may have challenges in terms of the grid coverage in the country.” [Respondent #3]*

#### **4.4.6 Existing EdTech Activities within Schools and Universities**

Respondents explained the various ways in which Uganda has already begun to integrate EdTech into its education system, including both from kindergarten to 12th grade (K-12) schools and universities:

*“Uganda has got established institutional structure from the pre-primary up to the universities and the post-university institutions, which are highly structured. And the universities are very well positioned for studies and research, including innovations. So, all the universities have embraced ICT for example as a key domain for learning. So, that means it provides an opportunity for learning, which is a very good practice already, and some of these university students are coming up with apps, they’re coming up with all sorts of software that can be applicable, innovations and so on that can be used, so that’s also a huge opportunity to use the existing institutions, the universities and other learning institutions that are in place. Also, the secondary or the lower-level institutions are basically digitalizing learning to great extent... it may be not total coverage, but that is always a potential, and it offers a good opportunity to build on in terms of ensuring that schools have got their platform institutionalised, they have got the infrastructure as part of their learning platform. And then ICT becomes a content of domain for learning in schools.” [Respondent #3]*

*“Last week, I had a school I visited and the headteacher had purchased over 40 projectors, is putting up internet connection, and was trying to link up like 6 classes together, and one teacher can teach from one class, and then the rest of the other classes receive the same teaching through a TV and all that, so we are seeing many of these developments. People are being ambitious; they want to be able to teach massively than ever before.” [Respondent #4]*

#### 4.4.7 Established EdTech Partnerships

With a network of 67 interconnected organisations focusing on EdTech, and with government agencies integrated throughout this network, Uganda has many well-established and active partnerships that can enable the scaling up of EdTech.

Respondents provided some examples of partnerships, including a range of different types of organisations. For instance, international organisations—such as UN agencies and multilateral banks—and international non-governmental agencies work together for advocacy and knowledge-sharing: *“there is an EdTech task team that is also led by Save the Children... it’s not only Save the Children that works in that task team. Save the Children’s role is only to co-convene or to convene task team meetings, but members come from UNICEF, Finn Church Aid (FCA), NRC, from Windle International, any partner. So, that collaboration is an evidence that yes, they come together and agree on common principle, on common direction to take.”* [Respondent #2]

Universities have also formed partnerships: *“for example by the African Association of Universities, and then there is another one which is coming on through RUFORUM, which is the Regional Universities Forum for Agriculture... and I think there was another one too, UNESCO, I think through UNESCO or one of the UN bodies, these ones had the programs for free use of technology in education, the first two are ongoing and the other one through UNESCO.”* [Respondent #5]

Government and non-government Uganda agencies partner with international agencies as well: *“For example, we have working groups. In these working groups, it draws together so many NGOs, it draws people from government, it draws people from the UN agencies. So, they meet, they discuss issues together, and are able to agree on actions together, that’s one way. And I think that’s the major way. Then, NGOs can also consort, they can build a Consortium, two, three, four NGOs can come together and begin to develop programs together, they begin to develop programs together, they begin to appreciate each other together and they’re able to work together.”* [Respondent #6]

### 4.5 Power Dynamics

As noted in the social network analysis, international organisations and bilateral development agencies hold central positions in the EdTech network within Uganda, suggesting the potential for a great deal of influence on the education sector and on the uptake of EdTech policies and initiatives. Explaining the dependence on international actors, a respondent noted the EdTech initiatives may not run or be sustained, given that Uganda *“heavily depends... on international donors... So, this is a very important factor that international donors, the availability of international donors, it’s a scary thought to think of. If we don’t have international donors, then a whole project might stop you know, this whole approach might stop... most of our donors ask us, “how are you planning to sustain this knowing that your government, you’ve shared with us, is not willing to put money forward, what are your plans?”* So, what we share with them is that *“we are robustly always looking for funding across Europe, Asia, Canada, and the US,”* and then sometimes, we even secure funding ahead of time to show the sustainability of these projects. Otherwise, the donor would be saying I don’t want to be the only person who funds this and then it stops... So, that’s how we manage to continue our work, because we know that our government is not willing to fund these projects, all these problems.” [Respondent #1]

Another respondent highlights the influence of UN agencies specifically as influential actors in the Uganda EdTech sector, given their role as funders and established relationships with the government: *“I look at UNICEF and UNHCR, those are UN agencies who are capable of supporting EdTech... So, I think UNICEF comes in front, because they have been supporting EdTech, they have been taking lead in piloting it, they have been funding it. So, the funding, you don’t just throw money anyhow, you only do it where I feel*



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*there's going to be an impact created. So, that's why I say I look at them as potential key investors in EdTech. Especially UNICEF, because UNICEF works with the government, they don't do direct implementation, especially programmes that target the community, they don't just look at the refugee community and go and do work only with the refugees. They work even with the government at the lower level, the local level. So, their implementation is through the district local government. They've funded district local government to implement their programs. So, I think they have a very good position in the government, I mean to work with the government, and influence the policy." [Respondent #2]*

Another respondent explains how different international organisations hold influence over different education sectors: *"At the international level, we have these organisation trying to do at the different levels. Let's take an example primary education, UNICEF is more there and supporting in there. When it gets to UNESCO, we find that UNESCO is supporting a lot of teacher training and TVET. And also ENABEL also supporting teacher training and TVET. And then you find more World Bank supporting more higher institutions of learning, which are at university level." [Respondent #4]*

Interviews also identified bilateral development agencies as key actors: *"The other influence will come from bilateral, ... also play a key role in terms of the policy influence.... Yes, because some of the embassies have a digital learning or education as one of their pillars or priority pillars, for example. I can give you an example of the republic of Belgium, that's one of their key pillars.... So, they have what they call the Educational Development Partners group, which meets monthly. So, they are able to advance some of those issues at that level and engage with their ministers and engage with the permanent secretaries, engage with the UN, you know, working together with the UN to be able to shape the policy. So, through that consortium of the Educational Development Partners group, they're able to influence some of the policies, and indeed they have." [Respondent #3]*

Although the analysis suggests that international organisations headquartered outside of the country—IOs, bilateral development agencies, and UN agencies—hold powerful positions in Uganda relating to the uptake of EdTech throughout the country, findings also show the pivotal position of the government, without which many of the relationships between other actors would not be as solid. The

government's support of digital education in its policies alongside its many relationships with other EdTech actors likely also offer legitimacy to the EdTech agenda in the country.

As the social network analysis found, the national government is a key player, particularly as a broker which bridges relationships between other types of actors. These findings were echoed in the interviews, which noted that the government spearheaded the development of the Digital Education Agenda: *"the government is an important actor here, the government is an important actor in this process of educational technology in Uganda. Yeah, even the steering, the pioneering the educational digital agenda, I think they are I would say high up there in terms of the adoption."* [Respondent #4]

Aligned with the social network analysis findings, interviews clarified that the government remains in a key position in part due to strong relationships with other types of actors: *"Well, I think for me in the order of ranking, I think, ultimately, the government has to take the lead. So, the government will be the first sector. With this digital agenda strategy, learning from what other development partners are doing, they will be playing a very huge role in providing leadership, coordination, and policy direction, compliance issues, standards and so on, and the regulations at that level. So, ultimately, I see them taking full responsibility and control, but of course, they do that in support with the other development partners that have already mentioned and we had alluded to. Each one of them play different roles. So, I will not say this one is more important than the other, but I can highlight what I see as the unique contribution of each one of them."* [Respondent #3]

The network analysis also suggests that a wide variety of other organisations – such as NGOs, INGOs, universities, etc. – are numerous although less central, and so may be active in EdTech but likely wield less influence. One respondent explains that local NGOs, for instance, might be best positioned in advocacy roles: *"For the local organisations, civil society organisations, and NGOs, I see them very crucial in mobilization for uptake of this technology, because many people are still conservative, and they're not willing to and easily adapt. So, people need to be mobilized, they need to be sensitized, they need to be informed, they need to change their perception and attitude to embrace the technology, because there's no use to put in all the infrastructure and put all the resources if people will still remain resistant."* [Respondent #3]

A key government partner that holds enormous influence over all forms of technology is the telecom companies. Respondents made clear that these service providers control the costs and reach of the internet, meaning they wield power over who gains access to EdTech solutions: *"the telecommunication companies such as MTN, Airtel... they have the capacity to change the dark side of communication to a brighter one.... What is needed is only either entering an MOU with them or working closely with them so that we don't hit a snag."* [Respondent #2]



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## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusion

The findings from analysing the social network, policy documents, and interviews suggest that Uganda may be well-positioned for EdTech scale up. However, challenges remain and any expansion of EdTech must take into account the likelihood of unexpected roadblocks and the need for flexibility.

That the government has voiced support for increased EdTech in its existing policies, including a strategy document solely dedicated to digital learning, shows a significant level of commitment. As the social network analysis shows, the Ugandan government and its agencies act as key brokers in the EdTech community, further demonstrating a dedication to EdTech advancement and its role in building relationships that might enable scale-up. Although interview respondents discussed a lack of political will, in particular relating to committing funds towards EdTech, other findings show an openness and support of government actors that could act as a foundation to building a better funding and governance infrastructure around digital learning. Uganda's relative political stability, notwithstanding political infighting, and nepotism—can help to ensure a degree of stability needed for scale-up.

The move to virtual learning and the need for EdTech solutions during the very lengthy COVID-19 school closures in the country revealed to many stakeholders the potential for increased access to and quality of learning with the use of technology. Although prior to the pandemic, education actors had already begun to discuss EdTech in earnest, respondents revealed how COVID-19 accelerated EdTech uptake and embrace. The present moment therefore presents a window of opportunity wherein educators, administrators, and other stakeholders see the value of EdTech.

The network analysis and interviews revealed an existing wide network of actors working in a range of partnerships that can further enable the scaling up of EdTech. These relationships bring together different types of organisations, between the state and non-state sectors, and between those headquartered in Uganda and globally. The relative size of this network and the variety of relationships reflect an EdTech community of actors already supporting technology in schools and prepared to work together in order to expand activities across the country's education system, at both the primary/secondary and university levels.

Of course, challenges remain that could act as barriers to further EdTech development and scale-up. Low public funding, the need to prioritise connectivity country-wide, stronger governance of technology programs including better implementation strategies, and greater collaboration between political actors remain challenges.

Economic challenges continue to impact all social sectors, including education, and EdTech scale-up would be an expensive endeavour that requires the government's budgetary commitment alongside donor funding. Within homes, the costs of the internet and devices continue to act as barriers, irrespective of government commitment.

The cost of internet, devices, and electricity leave many families without ready access to EdTech, alongside schools and communities primarily in rural areas. In this way, uneven access to technology could exacerbate inequities across the school-going population. A digital divide within Uganda aligns with geography, with those living and attending schools in urban centres able to access EdTech far more readily than those in rural communities.

The analysis showed that teachers' limited digital literacy and technology skills capacity impacts the implementation of EdTech initiatives. However, our study also highlighted government efforts to address this through professional development activities.

Some educators, families, and communities continue to hold cultural beliefs and attitudes that act as barriers to accepting EdTech as an important facet to education. Such attitudes could present a resistance to implementation of products and services. Consultation with communities prior to implementation of education technologies may lessen resistance.

Past EdTech initiatives, according to some respondents, have lacked adequate localisation. Free from local involvement in design and implementation, interventions lack contextualisation, and could be ineffective or unsustainable. Given that some of the most powerful actors within Uganda's EdTech network are international organisations and those headquartered outside of the country, attention to localisation in all EdTech interventions must be prioritised.

## 5.2 Recommendations



### 1. Fostering further partnerships with the government and capitalising on its readiness for scaling EdTech

Capitalise on the government's readiness and its role as a key actor in the EdTech environment in Uganda. This includes leveraging its relationships, political will, and existing robust policies. Wherever possible, include the government as an EdTech partner, and work to strengthen existing partnerships with government agencies.



### 2. Capitalising on the post-COVID moment for further advocacy and awareness raising on EdTech

Capitalise on the post-COVID moment, in particular in advocacy work on EdTech. In the current moment, many stakeholders have come to realise and embrace the value of the use of technology in education, and this momentum can be sustained with adequate campaigns and promotion.



### 3. Localising EdTech policies and programmes and consulting with local actors

Always localise policies and programmes. Prior to the development and implementation of any EdTech intervention, consult with local communities. Be prepared to alter and contextualise interventions depending on the needs and desires of local educators, students, and families.



### 4. Developing separate EdTech policies and strategies for rural and urban populations

Consider separate EdTech policies and goals for rural and urban populations, given disparities in access to electricity, internet connectivity, and devices. Additionally, rural, and urban populations will likely express different needs in relation to education, and so consultation with communities is necessary prior to developing any EdTech intervention (see the third recommendation above).



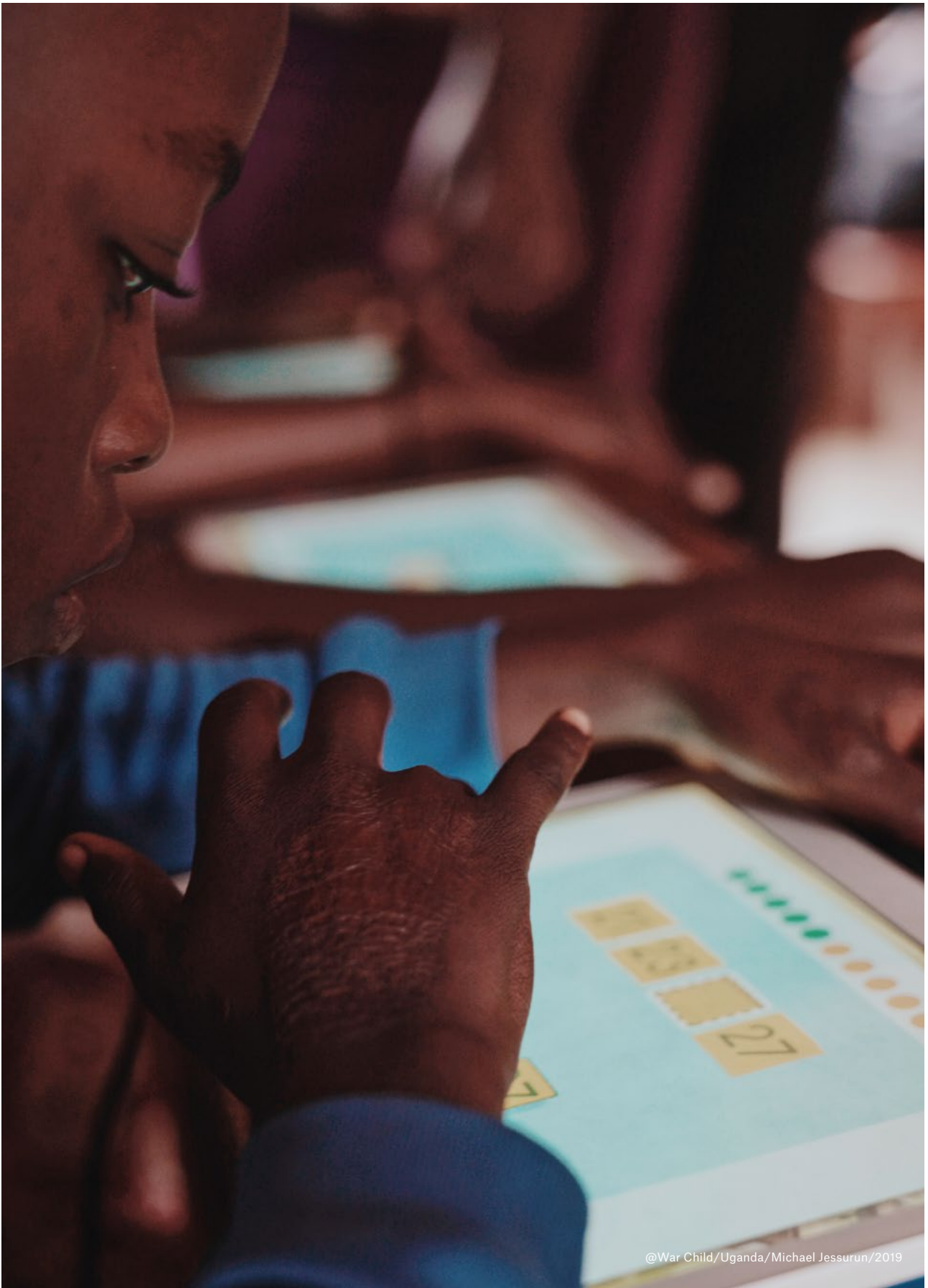
### 5. Integrating EdTech into teacher training programmes

Strengthen the integration of basic EdTech skills within initial teacher training (not only professional development), so that new teachers enter schools with a base minimum technological knowledge and ability to teach using EdTech.

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