

# Evaluating the Readiness to Implement an E-Learning Technology to Support Education

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**How to cite this paper:** Dr. Alone. Kimwise | Mudaheranwa Benjamin | Beatrice Mugabirwe "Evaluating the Readiness to Implement an E-Learning Technology to Support Education" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-5, August 2019, pp.2372-2378, <https://doi.org/10.31142/ijtsrd28023>



IJTSRD28023

pp.2372-2378,

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This radical changes is witnessed in all spheres of life and discipline ranging from education, politics, economics, industry, social, cultural, etc, disciplines such as political sciences, library and information science, law, mathematics, English studies, Literary works, agricultural science, mass communication just to mention a few. Thus, it is therefore appalling to comprehend a sector of any state or society to adapting to ICTs.

Information and Communication Technologies could be viewed as a coming together of technologies and telecommunication facilities for the purpose of information generation, processing, storage, retrieval, dissemination and use. However, in same vein, Obaseki (2017) stated that Information and Communication Technologies is the coming together or joining together of tools, facilities or technologies via local area network cables or optical fiber materials for the purpose of information use or transfer. Again, Obaseki (2017) further affirmed that ICTs are of different types and sizes and can be categorized into Hardware and Software. However, examples of ICTs includes projector machines, computer machines, internet/intranet switch, internet dish or mast, internet radio, routers, Local area network cables, optical fiber materials, Digital camera, internet hub, Thunder arrestors, Digital A4,A1, A2 scanners, etc. furthermore, observation by the authors revealed that the overwhelming

## ABSTRACT

The study sought thought to establish the preparedness of refugees in settlements to embrace E-learning and Multimedia Technology as useful tool for supporting education and learning especially in mathematics, and basic health education when implemented. The study which covered Nakivale refugee settlement adopted the cross-sectional survey research design. A questionnaire was administered to learners of senior one, primary six and an interview guide to teachers. The findings showed that majority of the respondents said that they did not have access to ICTs, Majority of the respondents were Ugandan origin and overall the respondents had low experience in performing computer functions. The findings gave a big view of the limited practical implication concerning the readiness to E-learning and Multimedia Technology adoption to support education and learning in schools in Uganda.

**KEYWORDS:** Information, Communication, Technologies, ICTs, Electronic-Learning, Multimedia, Technology, E-learning, Readiness.

## 1. INTRODUCTION

Information and Communication Technologies (ICTs) is observed to have tremendously impacted the way people do their work especially as the development of many economies is attributed by many authorities to be the proceed of an adequate adoption, implementation and use of both the policies and physical facilities of ICTs. Interestingly, previous decades and most especially, the last has witnessed an exponential and radical growth in the use and adoption of ICTs (Shihundu, 2014).

attributes vis-avis the characteristics of ICTs such as speed in information processing, use and of information transfer, flexibility, approachability, clarity, time maximizing, storage capacity, interoperability, approachability, space conservation etc has over the decades prompted the continuous dedicated adoption and systematic use of ICTs irrespective of the services or function especially when it is education related. Evidence from literatures had affirmed that the adoption of ICTs in the education sectors of the world have been with utmost success. Buttressing this statement in the words of Kasse and Balunywa (2013), adoption and usage of technologies in education has successfully implemented E-learning in the developed world. Similarly, the expansion in the use of the Internet in the mid-1990s is observed to have substantially changed the characteristics of education, initially in developed countries and increasingly in developing countries. The change includes the updating or replacing earlier modes of learning, such as correspondence courses, radio-based courses, and class room teaching. Electronic learning (E-learning) it is a form or system of learning that encourages the use of ICTs in teaching, reading and discussion process. Often times, it is used to foster distant teaching and learning. In the words of Kiilu and Muema, (2012) "Electronic-learning refers to the purposeful use of electronic systems in support of learning process. It is supported by electronic hardware and software

either online (synchronous) or offline (asynchronous).” The beauty of an innovation is exposed by the exposed by its adoption and use for the purpose for which it was implemented, hence, E-learning is not an exemption, because its adoption and use as ICTs largely depend on the dispositions of its intended user. Interestingly, a study by Hussin, Manap, Amir, and Krish, (2012) emphasized the importance of the readiness of e-learning enablers and learners for the successful implementation of e-learning. While, Okinda, (2014) viewed readiness is the assessment of certain organizational and individual factors that should be considered if organizations hope to be successful with the introduction of an e-learning or use of multimedia technology.

Nakivale refugee settlement is found in the rural district of Isingiro in south-western Uganda (UNHCR, 2014). It was officially recognized as a refugee settlement in 1960 after its establishment in 1958, and currently is considered to be the biggest refugee settlement in Africa and takes on the 8<sup>th</sup> position in the whole world with estimated population of over 80,000 people. These people are refugees from various parts of the world with majority coming from African countries which among these include: Rwanda, Congo, Burundi, Somalia, Eritrea, Sudan, Ethiopia and Kenya (Scroxtan, 2014). The settlement has only six government-owned schools (five primary schools and one secondary school) which are to serve 79 villages (UNHCR, 2014). Beside, the settlement has over 40,000 children who are victims of forced displacement, due to wars, conflicts, tortures, and human rights abuses. All these notwithstanding, research have proved that with quality education and help, refugee children can regain their hope for the future. However, there are still numerous barriers prohibiting these children from accessing quality education, and enjoying their full rights to education which among these include: use of poor teaching methods that are hardly interactive and less beneficial to students, high student failure rates and drop outs, lack of access to modern teaching and learning resources/facilities, teachers’ lack of Information Communication Technology (ICT) pedagogy skills, low teacher to high student ratio, and general lack of interest in education (UNHCR, 2014).

In its bid to respond to the above state of affair, it is observed that the Mbarara University of Science and Technology (MUST) through the department of Information Technology, partnering with the Swedish programme for ICT use in developing Regions (SPIDER), Stockholm University Sweden, realized that there was a need to come up with an idea of implementing an E-Learning & Multimedia Technology to support teaching and learning in five primary schools and the only one secondary school in the camp. As the above initiative was to be implemented, a need to assess and evaluate the readiness to implement E-learning and Multimedia Technology as useful tool for supporting education and learning especially in Mathematics, and Basic health education in Nakivale refugee settlement was necessary, hence this study which is on “Implementing an E-Learning and Multimedia Technology as Useful Tool for Supporting Education and Learning in Mathematics and Basic Health Education in Nakivale Refugee Settlement Isingiro District in South-Western Uganda.”

## 2. Review of Literature related to the variable of the study.

### A. Electronic Learning: its Importance and Use

Kiilu, (2012) “Electronic-learning refers to the purposeful use of electronic systems in support of learning process. It is supported by electronic hardware and software either online (synchronous) or offline (asynchronous).” Mtebe, Mbawilo & Kissaka, (2016). Research shows that the appropriate use of E-learning and multimedia technology in educational context provides quite a lot of benefits such as they they can help to improve students’ understanding of instructional materials. While Doculan (2016), was of the view that they (e-learning) can also simulate real processes such as motion, diffusion, and allow learners to execute virtual experiments that would be dangerous and costly to be conducted in a school laboratory. Interestingly, Thomas & Israel, (2013) were of the view that teachers tend to use these technologies to cheer up classroom lectures by using them to better demonstrate and explain difficult concepts that cannot be easily explained using text alone.

### B. Use of E-learning /Multimedia Technologies

Recent years have witnessed the increasing interest in the development and use of multimedia/E-learning technology to enhance the quality of teaching and learning in all spheres of educational institutions. Doculan, (2016) stated that multimedia technologies are digital technologies that combine text, graphics, audio, and animations to produce instructional materials. Also, research by Mtebe, Mbawilo and Kissaka, (2016) revealed that the appropriate use of multimedia technology in educational context provides quite a lot of benefits, they can help to improve students’ understanding of instructional materials. In the words of Doculan (2016), they can also simulate real processes such as motion, diffusion, or bonding atoms and allow learners to execute virtual experiments that would be dangerous and costly to be conducted in a school laboratory. Again, Thomas and Israel (2013) asserted that teachers tend to use these technologies to liven up classroom lectures by using them to better demonstrate and explain difficult concepts that cannot be easily explained using text alone. The use of multimedia technology can enable teachers to have access to the knowledge and expertise that was previously unavailable, hence contributing towards teachers’ professional development (Doculan, 2016). Furthermore, Leedy and Ormrod, (2010) provided a detailed analysis on how ICT can be used in teachers’ professional development. The author points out that multimedia technology can enhance teachers’ subject knowledge by providing teachers with resources that support professional enquiry, such as Internet access to a range of high quality, subject-focused multimedia resources related to the project’s content. Interestingly, Thomas and Israel (2013) added that ICT can also improve the quality of teachers’ pedagogical knowledge. For example, multimedia can enhance the way learners research a topic, and present their findings to others; therefore, support for sound, animation and video is also seen as highly advantageous. ICT can also upgrade teacher school knowledge, access to classroom planning and resources, exemplar curriculum activities, as well as to professional networks and tools that facilitate the sharing of practice. Despite the benefits of multimedia / E-learning technology when used to enhance or support of learning process. The extent to which a school is able to participate and benefit from these technologies depends on the school’s

readiness to implement these technologies. Literature reveals that even though schools are supplied with computers, they are underused and majority of educational organizations remain as they were decades ago, as they are not reaping planned benefits from technology to give reason for the investments (Kiilu, 2012).

### C. Readiness to Implement E-Learning and Multimedia Technology Models

Conceptualizing e-learning and multimedia readiness is crucial as it distinguishes the limitation of its applicability in a project and to provide a clear framework for any research study. This is because some scholars have rejected some definitions of E-learning out-rightly, while some have been acknowledged. Thus, before embark on E-learning implementation, it is crucial to decide on a general notion of the term and model of E-learning to create a strong technology plans for both learners and teachers, because barriers to the effective use of technology involves learners and teachers attitudes and resistance to change, concerns about funding, training deficiencies and inadequate access. E-learning readiness is defined as “the mental or physical preparedness of an organization for some E-learning experience or action (Oketch, Njihia & Wausi, 2012).” Furthermore, E-learning readiness was defined as “an organization’s ability to generate, disseminate and use digital information among its members to the betterment of their being. In addition, the need for administrative support, adequate funding, time and training has been identified as an essential good to facilitate change. According to literature and E-learning evaluation models, the determinants of E-readiness and multimedia technology in the context of a learning institution include the physical infrastructure of an organization, the level of usage of technology, institution ICT policy, and the human resource (Kiilu and Muema, 2012). For effective E-learning in schools, issues such as connectivity to various networks (internet, intranet, and mobile-telephone); sources of energy/power (electricity, standby generators) and equipment (computers, radios, videos, television, LCD projectors and software), e-learning laboratories, and information storage facilities (such as flash disks, CD-ROMs, DVDs) and trained personnel must be ensured (ITU, 2009). The World Bank (2002) further classifies e-readiness and multimedia technology into four perspectives: connectivity (the quality and extent of internet infrastructure), capability (organizations ability to deliver and consume E-learning), content (the quality and pervasiveness of online learning materials) and human capacity policy and cultural environment whereby the legal and regulatory environment affecting the ICT sector is considered, and finally the size of the ICT sector. Designed model as observed by Kiilu, (2012), measures the E-learning readiness of an organization by categorizing different factors into: psychological readiness sociological readiness; environmental readiness; human resourcereadiness; financial readiness; technological skill readiness; equipment readiness and content readiness. Interestingly a study from Nigeria by Siddiquah and Zeema (2017) confirmed that lack of ICTs and meager infrastructure foils the full implementation of ICTs in education).

Essentially, due to these observations and research findings, this research project will particularly address this gap by assessing the state of readiness to implement an E-learning and Multimedia Technology as useful tool for supporting

education and learning especially in mathematics, and basic health education in Nakivale refugee settlement.

### 3. Research Question

Three Major research questions were formulated for the study, these include

1. Does your school have Information and Communication Technology (ICT) infrastructure?
2. Do you have relevant experience in using Information and Communication Technology (ICT)?
3. What are the challenges of your school in acquiring and using Information and Communication Technology (ICT) for e- learning/ multimedia training?

### 4. Methodology

Cross sectional survey design was used to help in collecting quantitative data. This design helped in collecting large amount of data at a particular time to using the questionnaire to collect data from participants who were learners. An interview guide was also administered to the other participants who were teachers to compliment the responses from the learners who where subject of the study. The target population were 1271 learners from primary six, senior one and teachers in the five primary and one secondary school in Nakivale refugee settlement. Furthermore, learners from primary six and senior one were used for the research as they will easily understand the process during the implementation of the E-learning and Multimedia technology.

The six schools were selected based on division representation within the Nakivale refugee settlement, where sample size was selected by use of Krejcie and Morgan (1990). Krejcie and Morgan (1990) standardized tables show the sample sizes for different population (or proportion of it) at 95% confidence level; a sampling error of 5% is accepted by most evaluations. From Krejcie and Morgan’s table (1990), the optimal (effective and valid) sample size to represent a population of 1271 students was 297. According to the Krejcie and Morgan (1990) tables, the smaller the number of cases in the target population, the larger the sample proportion of that population and vice versa. In line with the above reasons, an accessible sample size of two hundred and ninety seven (297) i.e 277 learners and 20 teachers was selected.(See distribution of sample in table 1, below).

**Table 1: Showing Distribution of sample according to schools Using Krejcie and Morgans 1970 table**

Schools	No of Student in Class	%
Kahirimbi	35	12.6
Rubondo	35	12.6
Kabazana	35	12.6
Kashojwa	37	13.4
Juru	34	12.3
Nakivale ss	101	36.5
Total	277	100.0

Questionnaire and interview guide were the data collecting instrument. The questionnaire, allowed the researcher to collect large data from the sampled participants who independently proffered their responses. While the interview guide was administered to the teachers to complement the responses from the leaner’s. The data were collated in line with the stated research questions and



variables for the study, after which they were analyzed using descriptive statistical methods. Thereafter, the analyzed data were simply interpreted and the findings stated.

## 5. Data Analysis

Data collated for the study were collated, analyzed and discussed in line with the stated research questions for the study, as arranged bellow:

**Table 2. Demographic Information of the Respondents**

Gender Category	Frequency	%
Male	163	58.8
Female	114	41.2
Total	277	100.0
Age of Respondents	Frequency	%
10-14	116	41.9
15-17	160	57.8
18 and above	1	0.4
Total	277	100.0

As shown in table 2, majority of the respondents were male 163(58.8%) as opposed to female who were 114 (41.2%). This presupposes that generally, the margin between male and female is minimal. This implied that there was a fairly equal representation of the male and female participants (learners) in this study. Regarding age, majority of the respondents were in the age bracket of 15-17 years which had a percentage over half 160(57.8%) of the respondents. This was followed by respondents in the age bracket of 10-14 years with 116 (41.9%) and 18 and above years of age had the least response with 1 (0.4%) In a study carried out by Mitra (2005), it was highlighted that younger children as indicated in the above findings is that they are able to learn how to use computers on their own.

**Table3: Does your school have Information and Communication Technology (ICT) infrastructure?**

Do you have access to ICTs?	Frequency	%
Yes	64	23.1
No	213	76.9
Total	277	100.0
Do you use Available ICTs for learning?		%
Yes	130	46.9
No	147	53.1
Total	277	100.0
Do you know what Internet is?		%
Yes	34	12.3
No	243	87.7
Total	277	100.0
Do you use internet for learning?		%
Yes	19	16.9
No	258	93.1
Total	277	100.0
How often do you use ICTs and the internet for learning?		%
Weekly	5	1.8
Monthly	27	9.7
Never	245	88.5
Total	277	100.0
Have you ever received any training on how to use ICTs?		%
Yes	48	17.3
No	229	82.7
Total	277	100.0

As depicted in table 3. Majority of the respondents said that did not have access to ICTs 213(76.9%) while those who had access were of a small number 64 (23.1%). Notably, slightly more than half of the learners asserted that they did not use available ICTs for learning 147(53.1%) compared to those who said yes 130 (46.9%). Regarding knowing what internet was, majority of the respondents 243(87.7) said that they did not have knowledge about it compared to those who said yes with a small number of 34(12.3%). The respondents who were asked to indicate whether they used internet for learning. The findings showed that almost all the respondents 258(93.1%) did not use internet for learning compared those who said yes 19(16.1%) that they used it. Findings also revealed that, majority of the respondents 245 (88.5%) said that they had never often used ICTs and internet in their learning, while 27(9.7%) said that they often use it monthly and 5(1.8%) use it weekly. Regarding whether respondents had ever received any training on how to use ICTs, the findings established that majority of them affirmed by saying no 229(82.7%) compared to those who said yes 48(17.3%). In relation this finding,

Furthermore the interview responses confirmed that the schools did not have computers, internet and have never used any of the mentioned ICTs for teaching and learning. For example, some of the Mathematics and science teachers respectively said: "My school has never had any computers let alone internet, we do not have electricity, I have never even used these things for teaching and learning after all I do not even know how to use the computers in short we do not have any access to them", "We do not have computers in this school, plus internet and we use traditional means of teaching" and "We have never had any kind of training or received any, like I said before we do not have computers here but with some training and some computers everything would be okay though I suggest provision of generators as well, we do not have electricity."

**Table 4 Experience in Using Information and Communication Technologies**

How proficient are you in performing the functions below?	Mean	Std. Deviation
I can print a document/ use a printer	1.09	0.39
I can open and use a web browser and Internet proficiently	1.09	0.39
I can use office tools e.g., spreadsheets, word processors, etc.	1.09	0.39
I know how to save information on a computer or external disk/storage	2.0	0.92
I can open a previously saved file from a computer, drive/directory	2.00	0.92
I know how to send and receive e-mail including emails with file attachments	1.33	0.84
I can (re)start a computer.	3.10	2.90
Total	1.67	0.96

Table 4 above, showed that the respondents had little or no experience in performing computer functions as it is justified by total mean (1.67) and standard. Deviation (0.96) suggesting more need for enhancement or training. This

response was occasioned by lack of knowledge in using a printer, opening and using a web browser, lack of internet proficiency, and inadequacies in using Microsoft office tools (1.09, 0.39), knowing how to send and receive e-mail, attaché file attachments to email (1.33, 0.84). The table also revealed that respondents had no knowledge in saving information on a computer or external disk/storage and opening previously saved file from a computer, drive/directory (2.0, 0.92). Notably, other respondents

agreed that they were knowledgeable in (re) booting a computer (3.10, 2.90). Accordingly, the interview responses corroborated the findings from analyzed data as it revealed that their experience in using computer functions as well as exposure to E-Learning is limited considering the less interactions they have had with computers, though some stated that they have used and had interactions with computers outside the school.

**Table 5 Challenges of using Information and Communication Technology (ICT) for Learning**

Items	Strongly Disagree	Disagree	Agree	Strongly agree
Lack of computers at school	60 (21.7%)	7(2.5%)	10(3.6%)	200(72.2%)
Lack of internet connectivity	50(18.1%)	11(4.0%)	8(2.9%)	208(75.0%)
Lack of skills to use the computers	46(16.6%)	26(9.4%)	16(5.8%)	189(68.2%)
Lack of technical support for learners	55(19.9%)	15(5.4%)	33(11.9%)	174(62.8%)
English literacy	30(10.1%)	169(61.0%)	20(7.2%)	58(20.9%)
Costs of computer hardware and software	55(19.9%)	54(19.5%)	15(5.4%)	153(55.2%)
Electricity shortage	73(26.4%)	5(1.8%)	10(3.6%)	189(68.2%)

The above table, revealed the respondents (75.0%) were of the opinion that lack of internet connectivity is the major challenge facing learners in use of ICT for learning, while 72.2%) also agreed that lack of computers at their school is a challenge. The interview response supported pointed out this challenge “i am very happy about this program but our students are many, so how many computers you will provide to cover all of them plus most of us lack training on using these computers when brought so I was suggesting for some training, we do not have a computer library.” However, (68.2%) of the respondents strongly agreed that lack of skills to use the computers and electricity shortage affects their use of ICT for learning as well. This response however corroborates the interview response that “Electricity is a problem here, unless you are also providing solar or generators I fear for the initiative, I mean it will be in vain. Interestingly, another majority (62.8%) strongly agreed that lack of technical support affected them. Similarly, (55.2%) of the respondents strongly agreed that huge costs of computer hardware and software was a major challenge towards the use of ICT for learning. On the contrary (61.0%) disagreed that English literacy affected their use of ICT for learning. This was further buttressed by an interview response that “I have never prepared content using a computer and thus the Implementation of E-Learning will be a challenge” and “Our pupils have no Idea on how a computer works, I have never prepared content and I certainly lack training hopefully you train us first.”

## 6. Discussions and Findings

The analyzed data from the study revealed that majority of the respondents were male while majority of the respondents were between 15-17 years. The study findings have shown that the schools in Nakivale Refugee Settlement have no ICT infrastructure that will surmount to the implementation of an e-learning/multimedia technological center. This is factual as responses from the respondents in table 3 showed majority (76.9%) saying that they don't have access to ICTs; 147(53.1%) asserted that they don't use ICTs for learning, while 243 (87.7) majority of the respondents said that they don't have knowledge of what internet is. Interestingly, ITU (2009) says that for effective E-learning in schools facilities such as connectivity to various equipment (computers, radios, videos, television, LCD projectors and software), e-learning laboratories, and information storage

Furthermore the interview responses confirmed that the schools did not have computers, internet and have never used any of the mentioned ICTs for teaching and learning. For example, some of the Mathematics and science teachers respectively said: “My school has never had any computers let alone internet, we do not have electricity, interestingly, and the study has proven that the learners in the schools in Nakivale Refugee Settlement had no knowledge of ICTs usage. This is shown in Table 4, were with total mean (1.67) and standard. Deviation (0.96) agreed to the need for enhancement or training, (1.09, 0.39) of the respondents stated that they lack the knowledge of using a printer, opening and using a web browser, lack of internet proficiency, and inadequacies in using Microsoft office tools etc. Thus in buttressing the findings, Link and Marz (2006) concluded that learners need to have adequate technological computer knowledge in order to avoid the frustrations experienced when trying to access an online classroom, while Haverila (2011) asserted that learners' prior experience in using information technology is important in e-learning adoption though not mandatory. These views were further corroborated by responses from the interview that their experience in using computer functions as well as exposure to e-Learning is limited considering the less interactions they have had with computers, though some stated that they have used and had interactions with computers outside the school. In line with the above findings Oketch, Njihia, & Wausi, (2014) asserted that for users to be able to use any E-learning system they should possess the necessary technical skills. While kimwise (2017) explains technological readiness as a state where a person has a degree of technical competencies that can be observed and measured for example knowing how to print or start a computer. Literature reveals that in order to avoid learners becoming frustrated with E-learning, they must have a suitable level of computer knowledge. Lack of the technological readiness would lead to learner frustration. Furthermore, analyzed data revealed that the respondents (75.0%) were of the opinion that lack of internet connectivity is the major challenge facing learners in using ICT for learning, while (72.2%) stated that lack of computers at their school is a challenge. These challenges were corroborated by an interviewee response supported that “i am very happy about this program but our students are many, so how many computers you will provide to cover all

of them plus most of us lack training on using these computers when brought so I was suggesting for some training, we do not have a computer library." These findings are in line with Opira (2010) observation that institutions in Africa face barriers to effective integration of ICT in the teaching and learning process in terms of limited infrastructure to provide satisfactory physical conditions of laboratories and the subsequent accessibility of the resources (ICT) to the learners. Further stressing the poor state of facilities Mulwa and Kyalo (n.d) asserted that availability of e-infrastructure needs to be dealt with in order to give a true picture of the specific operational environment.

The following findings from the study were revealed from the analyzed data after a careful corroboration with literatures:

1. Majority of the respondents said that they did not have access to ICTs
2. Most of the respondents had low experience in performing computer functions
3. lack of internet connectivity was a major challenge facing learners in using ICT for learning
4. Interviews with teachers confirmed that the schools did not have computers, internet and have never used any of the mentioned ICTs for teaching and learning
5. Schools in Nakivale Refugee Settlement did not have electricity
6. Results revealed that learners and the school at large were not technologically ready to adopt e-learning system.

## 7. Conclusions

The practical implication of this study is that, the learners and teachers should be availed or trained in performing computer functions and in addition, the school management should provide internet connectivity and computers at school to allow learners and teachers to access e-learning resources. Also, in this study data was collected from only a section of learners of senior one and primary six and interviewed only teachers of mathematics and basic health education from Nakivale refugee settlement schools. This could limit the generalization as the analysis did not cover the entire population of the schools including those outside the refugee settlement therefore calling for future studies to consider schools and learners from other schools rather than only those from the refugee settlement alone.

## Acknowledgments

Office of the Prime Minister  
Kampala International University  
Department of Information Technology from Mbarara University of Science and Technology, (MUST).

## Funding

Swedish Program for Information Technology in Developing Regions (SPIDER), Department of Computer and Systems Science Stockholm University (Sweden)

## Availability of Data and Materials

The data will not be shared because this data can be used only by the researchers

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

All authors read and approved the final manuscript.

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