

Full Length Research Paper

Discourses in ICT integration: Pedagogical orientations in selected city primary schools in Uganda

Muweesi Charles^{1,2*}, Lou Shizhou¹, Nakonde Justine³, Jerome Kotira Salome^{1,4},
Tomusange Robert⁵ and Sserwadda Lawrence⁶

¹Institute of International and Comparative Education, College of Teacher Education, Zhejiang Normal University, China.

²Department of Education, Faculty of Science and Education, Busitema University, Uganda.

³Department of Sociology and Social Administration, Faculty of Arts and Social Sciences, Kyambogo University, Uganda.

⁴Institute of Kiswahili Language, Faculty of Education, University of Dar es Salaam, Tanzania.

⁵Department of Comparative Education, School of Education, Central China Normal University, China.

⁶Department of Open and Distance Learning, School of Distance and Life Long Learning, Makerere University, Uganda.

Received 25 November, 2020; Accepted 1 February, 2021

This study sought to recognize the tricky keystones in the execution of the amalgamation of ICT usage during teaching and learning in Ugandan city primary schools in Kampala focusing on the cumbersomeness teachers face while employing modern ICT tools and pedagogical experiences. A mixed research design with compliments from questionnaires, interviews and classroom observations was employed in the study to obtain data from the respondents (N=80). It was observed that teachers and students occasionally/rarely had access to technological tools due to limited time allocation and an insufficient number of technological tools and this negatively affects lessons. Teachers' lack of ICT skills is due to inadequate training that intensely influences the use of ICT in the classroom despite most of the schools being highly populated. It was thus established that for effective and efficient use of ICT tools in Ugandan schools, the government via the Ministry of Education should consider involving all teachers in rigorous ICT training to gain adequate knowledge and skills. The more ICT training is prioritized, the more integrating ICT in pedagogical orientation in primary schools will be enhanced. Thus, teacher access to personal laptops, exposure laboratories, and teacher's continuous ICT training sessions could be a good recommendation/justification if the government is to achieve its vision 2040 ICT agenda.

Key words: Primary education in Uganda, ICT usage agenda, Vision 2040 in Uganda, teachers digital pedagogy.

INTRODUCTION

The use of Information Communication and Technology (ICT) education in Uganda began way back in the 1980s,

possibly due to the belief that ICT can offer unprecedented opportunities to enhance quality, access

*Corresponding author. Email: cmuweesi@sci.busitema.ac.ug.

Author(s) agree that this article remain permanently open access under the terms of the [Creative Commons Attribution License 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

and equity in education and training (INTO, 2017). There were reported positive results in the use of ICT in education, including the following benefits: improved lesson delivery, student involvement, provision of information, and facilitated information and knowledge sharing among teachers and students towards the training and development of students to more productive adults for national development in the 21st century. All learning institutions in Uganda are encouraged to use ICT (UCC, 2014). The education stakeholders believe that application of ICTs in the teaching-learning process can enhance the quality of education in several ways like accelerating, enriching, and deepening skills, that motivate and engage students, enabling them to link school experience to work practices (Mutonyi and Norton, 2007), hence creating economic viability; in addition, it strengthens teaching and enable schools to transform (Moges, 2014). The use of ICT in education in Uganda has been taking place in higher institutions and secondary schools. The education sector thought of exposing learners to ICT tools at an early age to reinforce the acquisition of ICT knowledge and skills at a tender age (Stephen, n.d.). These will lead to learners being well positioned to have a strong foundation in technology, and will, later on, lead to learners being creative and competitive for the current globalisation (Abas, 2009). The nature of Education in Uganda continues to be readjusted either politically or depending on societal needs. Equipping citizens with technological skills was considered as a basic need in Education by the current government. The government through the Ministry of Education saw the need of providing technological tools to selected urban primary schools as a way to benchmark for other learners across the country using ICT in learning drive (The Republic of Uganda, 2012).

These were to transform the teaching and learning processes to provide learners with the necessary skills and knowledge so that they can be competitive and able to thrive in the 21st century era. This study intended to identify the reasons underlying the problematic implementation of integration of ICT in teaching and learning.

The official use of ICT in the selected urban primary schools took place recently and was rolled out by the Ministry of Education and Sports in partnership with Ministry of ICT and other development partners; however, most teachers prefer to use traditional methods of teaching. They are still struggling with how to use ICT tool in their classroom teaching, which has made it difficult to resolve this situation. Why are Ugandan Primary school teachers still reluctant or incapable of teaching using technology? From general observations, teachers struggle to use technology in the classroom due to various reasons that range from school leadership, lack of training, lack of equipment and many students in the classroom. In some schools, lower primary sections are the ones that use ICT in learning and teaching.

School leaders and other teachers in schools do not involve themselves in the ICT use process due to aggressiveness towards national assessments. Lower primary teachers lack support by fellow teachers, school leaders and school administration. Also, teachers lack ICT knowledge; they find it challenging to link curriculum with the learning software due to insufficient ICT training, that affects their attitude, beliefs and perceptions towards ICT use in the classroom. Older teachers mostly teach lower classes in Ugandan schools as they find technology challenging for them. Can old age be a contributing factor to poor implementation? The ICT tools distributed to schools are inadequate as compared to students' population in public primary schools. Public schools lack infrastructure and have high student population which results from continuous students' enrollment process in schools. The number of ICT tools provided to schools might have been enough for students, but due to the ongoing high enrollment process, they are insufficient. Therefore, it is necessary to identify the reasons underlying the problematic keystones in implementation of the integration of ICT in teaching and learning in selected Ugandan urban primary schools.

REVIEW OF RELATED LITERATURE

ICT in teaching and learning

Assimilation of ICT in teaching and learning is valuable to both teachers and students because it provides a dynamic and proactive teaching-learning environment that is initiated by the teachers (Arnseth and Hatlevik, 2010). Almas and Krumsvik (2008) argued that ICT is believed to play a significant role in lesson presentation and exploration to facilitate learning and improve teachers and learners' performances. Teaching and learning using ICTs is a process where the teacher guides learners to construct their knowledge during the learning process. The learning process is majorly learner-centred where teachers facilitate learning, unlike the traditional learning methods where teachers are producers of knowledge. This type of learning model enables students to be critical thinkers and have an open mind. Creativity in student's ignition is through this learning process, and students get the inner motivation of desiring to learn from their colleagues through brainstorming and sharing.

Modern technology offers many tools that can be used in classrooms to improve teaching and learning quality (Hamidi et al., 2011). These tools provide teachers with a variety of resources that they use to plan their ICT lessons. They also allow students to have many reference materials that help them in their learning process. After equipping students with technological skills and knowledge, they are set to face future challenges based on proper understanding (Costin, 2017). They will

be confident to face the future since they acquired the necessary skills to thrive in the current 21st century.

Impact of ICT on learners

ICTs is beneficial to students of all levels as it does not only help them in their knowledge acquisition process but also enhances students innovation, acceleration, enrichment and deepening of skills. It also enhances their motivation and engagement in learning the learning process, through which the students connect school experience to work practices that are crucial for economic development, strengthen teaching and help schools change (Noor-ul-amin, 2017).

ICT is also essential in students learning process because when students use ICT tools in their classroom, they become immersed in the process of learning and more students use computers as information sources and cognitive tools (Moges, 2014). This facilitates faster retention of the knowledge learned and also increases a student's concentration skills. Students learn to be attentive learners who keenly involve themselves in their studies. Students are shaped by ICT to be smart learners. The skill attained enable learners to learn better. Through these ways, the quality of education acquired improves since their learning motivation and engagement is improved. Moges (2014) postulated that when students use ICT, learning characteristics and problem tasks transform, it is because ICT enhances students' cognitive development and acquisition of generic cognitive competencies.

Learning using ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student-centred settings and by enabling learning to be related to context and to practice (Barron, 1998; Berge, 1998). Use of ICT in learning engages and inspires students, and also contributes to the adaption of ICT in education (Richard, 2015).

ICT in contemporary primary schools

Primary school education lays the foundation for childhood education. The nature of education students acquire in their early years has a significant influence on how they will fare in the whole course of their education. That is why there is a need to expose learners to the best education as in their early years. Infusing ICT in primary education allows learners to build their education foundation actively. These are because they will need those skills throughout their course of education and the rest of their lifetime (Selwyn and Bullon, 2002). Currently, application of ICT is in almost every aspect of our daily activities throughout the world. Enlightening children about ICT at an early age empowers them, and makes them have an added advantage of successfully

competing in the 21st century. A research conducted under Ofsted (An Office for Standards in Education) to identify good practices in ICT in teaching took place in 2005 and 2008 (Ofsted, 2009). The study findings showed that ICT had contributed to improving the performance of children in some subject areas even though the curriculum was poorly balanced. Not only does ICT equip students with knowledge and skills, it also grants them an opportunity to link their curriculum with daily life activities.

The very essence of ICT in children's education is for them to become engaged in their learning and also allow teachers to manage large class sizes. Also, students learn to collaborate with their peers, hence making the learning environment to be rewarding. The use of technology in learning excites students so much; they always look forward to learning using technological tools. However, their classroom engagement while using a computer is significantly affected by other factors (Selwyn and Bullon, 2002) which include a large number of students in the classroom, few numbers of technological equipment, unreliable power supply, and limited technological infrastructure.

Teachers in primary schools are willing to use ICT in teaching in their classroom, but tend to encounter obstacles from within and outside the school environments that hinder them from effectively applying it. According to Andoh (2012), factors affecting learning in the classroom could be due to insufficient government investment in the development of the subject and lack of enough structure and support on how to teach different subjects. When the government takes an initiative of minimising problems that might arise in classrooms when teachers use ICT, better results are achievable.

Challenges facing teachers while integrating ICT in teaching and learning

Teachers are the driving force behind the implementation of ICT in schools. However, they can successfully do so after managing the limiting factors. Teachers are sometimes afraid of using new technologies in the classroom. These might be due to fear of the unknown or afraid of change. Teachers fear of technology in the classroom might be due to lack of sufficient knowledge on how to fuse technology with learning (Davis, 2003). If not exposed to ICT training, they will not be able to transfer skills to learners. Obijiofor (2009) argued that lack of continuous professional training is another factor hindering teachers' use of ICT. On the contrary, provision of these training, enough time to learn, practice and peer collaboration enables teachers to adopt ICT in the classroom. During this training, teacher's attitudes and beliefs should be well tackled to help them understand the importance of using ICTs in teaching. Lack of understanding of why and how they should use ICT and

how exactly they should use them is a challenge to the implementation of ICT in schools (Higgins and Moseley, 2011).

Countries located in the sub-Saharan African are finding it challenging to implement ICT in education. These are because of the many challenges in place, which include lack of stable supply power, infrastructure, teacher training and a large number of students. These many factors in place show that integration of ICT in teaching and learning is not dependent on just one factor, but on several interrelated factors that directly or indirectly affect the use of ICT in classroom instructions (Tedla, 2016).

Successful integrations of ICT can only take place after dealing with the challenges at school levels. Laronde et al. (2017) listed some of the challenges that contribute to unpreparedness for the laptops as well as computer implementation in school, which include lack of adequate training in ICT for teachers and administrators, limited computer hardware for administrative work, lack of time and absence of appropriate administrative software. There is a need to expose everyone in the school to ICT tools, which will equip them with ICT tools and knowledge, and will be resourceful to teachers who are implementing ICT in classrooms. Also, the lack of insufficient technological awareness and how to link it with the existing pedagogical content knowledge to support student learning (Hutchison and Reinking, 2011) is a factor too. Inadequate training leaves teachers vulnerable. There is a need for schools to implement professional development programs for teachers' skills to continuously be sharpened. Teacher training schools can also help to manage these by including computer courses in their training curriculum.

The other challenge that teachers encounter is large class sizes. Blatchford et al. (2011) suggested that classroom management with large class sizes can be challenging for teachers, especially when there are few computers in place. It becomes difficult to achieve learning goals because many students have to share one computer. In the process, it happens that only a few students actually follow. Kiptalam and Rodrigues (2010) found out that access to ICT facilities is a significant challenge in most African countries, as there is a ratio of one computer to 150 children against the ratio of 1:15 in the developed countries. The use of ICT tools in learning is thought to help manage large class sizes, but if the ICT tools are limited, it becomes difficult for the teachers.

Infrastructure and ICT tools maintenance is also one of the challenges teachers encounter. Poor ICT infrastructure, for instance, computer laboratories limits teachers from maximizing the use of ICT tools fully. If a school does not have enough infrastructures, the teacher is forced to keep on improvising ways on how to use the tools in teaching and learning. These become an added duty on teachers' tables which makes them waste much time rather than invest them in teaching. Lack of proper structure for equipment maintenance leads to teachers

and administrators being afraid of using the tools. The fear is due to the distress of being charged to repair the equipment. Liu and Szabo (2009) observed that teachers' challenges are due to a lack of technical and financial support. Technological equipment needs proper maintenance else they become inefficient.

It is critical to fathom those factors that affect the process by which teachers integrate ICT's into teaching (Chigona et al., 2010). Administrators and school leaders should be well informed about the ICT implementation process. These will help them to always be ready to support the implementing teachers. In terms of being supportive, decisive leadership and pedagogical assistance provided to teachers encourage them to use technology (Stoll et al., 2012). There is also a need for teachers' collaboration and peer (pedagogical) support as lack of these along with inexperience among cooperating teachers (Ertmer and Otterbreit-Leftwich 2010), leaves implementing teachers helpless and become overwhelmed by their daily school activities unlike when others are available to collaborate and support them.

STUDY METHODOLOGY

The study sought to use a mixed method research design that involves qualitative and quantitative research approaches. Quantitative and qualitative research methods when used in a single study reveal findings that complement, inform, illustrate, diversify views, confirm and discover the finding of a phenomenon. In this case, the finding obtained from questionnaires could help the researcher understand respondents' settings and behaviour, whereas interviews and classroom observations allowed the researcher to understand their context clearly. Only five public primary schools in Kampala City were sampled. The choice of the schools is purposive in that the city divisions comprised those that have been lagging in terms of academic achievement for the past years. Questionnaires were used to gather quantitative data due to their nature of obtaining quantity information and were analysed using SPSS. The interviews helped in data collection since it is one of the primary techniques used in qualitative research method. The study also conducted classroom observations to have a real experience of a lesson integrated with ICT. These were well coded, transcribed and transmitted qualitatively.

DATA PRESENTATION AND ANALYSIS

Classroom factors that influence ICT use in learning

Data results of factors influencing teachers and student's ICT use in learning show that many factors contribute to inefficient integration of ICT in education (Table 1). The findings show that teachers have limited access to computing devices, lack of ICT knowledge and skills, limited time to plan and use technological tools and limited access to digital resources. It is described in six (6) questions ranging from Q1-Q6 (Table 3).

Teachers' and student's ICT knowledge and skills

Teachers and students need ICT knowledge and skills to be able to use technological tools in learning. The findings showed that 60% of the teachers and students occasionally had access to

Table 1. Summary of participants (N=80).

Title	Item	Number
Head teacher	Questionnaire	5
Deputy head teacher	Questionnaire	5
Students	Questionnaire (group)	50
Teachers	Interview	15
Laboratory technicians	Interview	5

Table 2. Interviewed teachers' summary.

Teacher's name	Teaching grade	Experience	School	Reporting name
T1	2	2years	P1	T1-P1
T2	1	1year	P2	T2-P2
T3	2	2years	P3	T3-P3
T4	3	2years	P4	T4-P4
T5	1	One year	P5	T5-P5

Source: Primary data.

Table 3. Questions from Q1-Q6.

Q1	Q2	Q3	Q4	Q5	Q6
Teachers and students' access to ICT tools.	They have enough time to use ICT in the classroom	They have regular access to digital learning resources	Students use a dedicated computing device	students use a shared computing device	Teachers attend ICT training regularly.

Source: Primary data.

technological tools. 20% have frequent access, and 20% always have access. These show that teachers and students hardly had access to technological tools and is occasioned by limited time and an insufficient number of technological tools. "Sometimes, they do not have adequate time to use ICT in the classroom; Never (12)20%, Sometimes (48)80%."

One teacher who narrated that evidenced these;

"The lesson takes longer due to time wastage in preparation of ICT tools which involved transporting them from administration office to the classroom and setting up the tablets; there is need to do so since our school does not have a computer lab structure." (T5-P5) (Table 2).

This pinpoints that lack of enough time to use ICT tools negatively affects lessons. ICT lessons need extra time to prepare the tools and execute lessons. These draw the attention of school leaders to adjust the time allocated for classes that use ICT. Access to digital learning materials was minimal due to lack of computer lab structure, lack of time and technological tools. 80% never had regular access to digital learning resources whereas 20% sometimes have access. The numbers of technological tools are less compared to a large number of students." 60% of the students never had access to a dedicated computing device, and 40% sometimes did. Inadequate tools forced students to share computing devices during the learning process. 80% of the students

occasionally have access to a shared computing device, and 20% frequently have access.

One teacher and one laboratory technician supported these; they narrated that;

"ICT integrated lesson takes much time as compared to the traditional lesson. Also, there are many students in classes, hence a challenge to teachers. However, students' level of grasping content is higher in ICT classrooms."LT2
ICT has a positive impact on students. Nevertheless, a large number of students to computer ratio is a problem when it comes to classroom learning." (T2-P2)

These indicate that there are few ICT tools in schools yet the number of students is high. The ICT tools are not enough to accommodate these large number of students hence a challenge when learning using ICT tools. These call for government stakeholders to intervene in the situation by providing enough tools for learning (Figure 1).

Teachers' lack of ICT skills is due to inadequate training that intensely influences the use of ICT in the classroom. Their insufficient skills directly affect learners. (60)100% of teachers "never attend ICT training regularly. Students who used ICT in learning were of 7-9 years old. Their lack of ICT skills negatively affects their learning pace too. However, ICT integration has positively contributed to the learning process.

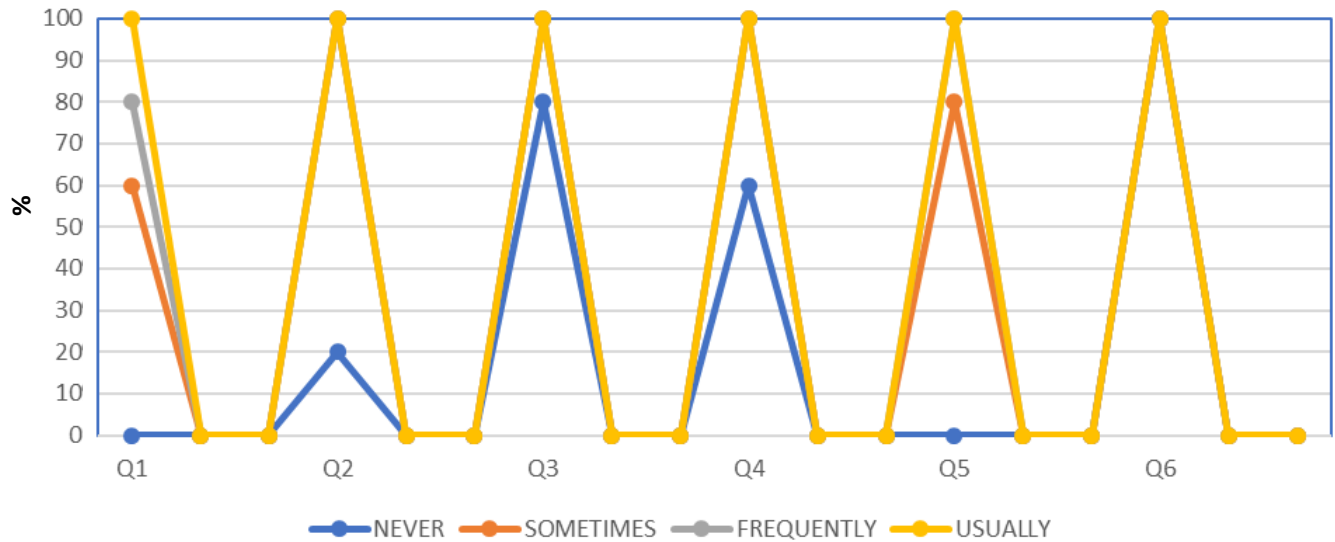


Figure 1. The indicative line graph showing response results of teachers' and students' ICT knowledge and skills on actual use of technology in teaching.

Two teachers narrated that;

"All learners are well taken care of by the use of ICT, and they do exercises at their own pace. The tablets accommodate slow learners; this enables them to catch up with others and has helped them to retain content taught in the classroom." (LT3).

"ICT impresses the students, and has led to students' improvement in performance, but the challenge is that the computer tools provided are few. Moreover, it is essential as it reinforces learning and makes it exciting. Since the introduction of ICT in public primary schools, learners have had a remarkable improvement in their performance" (LT1).

These show that ICT is essential in the learning process with students and teachers highly benefiting from it. Therefore, there is a need to minimize all factors that contribute to poor implementation in the use of ICT.

DISCUSSION OF FINDINGS

Classroom factors that influence students' ICT use in learning

In an ICT classroom set up, many factors influence how learning and teaching process takes place. The factors mentioned in this study were: students and teachers lack ICT skills, lack of computer tools, large class sizes, unstable power and lack of enough time. Interviewed teachers reported that for an ICT lesson to take place, many activities must be taken into consideration; for instance, the teacher needs time to plan for the lesson, prepare and set up technological tools. For those schools that lack a computer lab structure, it involves teachers transporting of technological tools to their classrooms.

Nevertheless, the research findings showed that students could highly benefit from the use of ICT in their

classes as they understand and grasp concepts easily and quickly. Also, the introduction of ICT in schools has helped to curb absenteeism. This is because the student finds ICT lessons interesting because they are usually deeply involved in active learning.

Size of classes

Most of the Ugandan city primary schools generally have high students' population. School enrollment rate increased after the government introduced free primary education. This research took place in Kampala city in Uganda. The schools sampled for the study had a diverse student population. There were those who had many students while others few students. The rate of enrollment in schools highly depends on the school location. Most schools reported higher student population; they also mentioned that the enrollment process is continuous throughout the year. When the government was introducing the use of ICT tools in schools, they provided tools as per the number of students in school; however, due to the continuous enrollment process, the tools cannot accommodate learners. Therefore, large class sizes is a factor that negatively affects the use of ICT tools in classrooms as reaffirmed by Stoll et al. (2012).

Bauer and Kenton (2005) conducted a study that revealed teachers were highly educated and skilled with technology. They were innovative and skilled at overcoming obstacles yet; they did not integrate technology continually for both teaching and learning. Failure to do so was occasioned by lack of enough computers for students, and lack of teachers extra planning time for technology lessons. These study

findings show that teaching using ICT for teachers was challenging due to the lack of infrastructure and ICT tools. Most of the schools lacked computer laboratories forcing teachers to improvise ways of teaching with technological tools in classrooms. Also, the classroom structure is not well furnished to accommodate technological tools. In some schools, there were many students in classes, while the number of computer tools was few. It was difficult for teachers to manage this type of classes since other students could not access the learning material in the tools. That could force the teachers to group students so that they could learn in shifts. These made the learning process to take more time than expected.

Student population relative to computer-ratio

There was a large school population in the sampled schools of this study. The number of students was stated to be higher in the schools' lower primary section, yet the computers and ICT tools provided for learning are fewer in number. These were in the schools located in highly populated areas. Although some schools had enough tablets for each student, still every student could not have free access to software learning content due to connectivity issues. This problem could arise during the connection as the computers have to be connected to a content server for students for it to show learning materials. However, these content servers had slow bandwidth which limited it from sending signals to many tablets during the loading process. At the end of it, many tablets could be disconnected forcing students to share with others and this scholarly-wise was advanced by Rich et al. (2010).

Students ICT knowledge and skills

In this study, ICT had impacted students differently; it has led to students' improvement in terms of ICT skills, knowledge and increased student involvement in the learning process. Besides, ICT has managed to transform teaching and to learn in a real-life situation. These are through the pictures and videos that are part of the learning content installed in the software, hence no need to arrange for many field trips. Research findings showed that the use of ICT in teaching leads to the student-centred type of learning that considers different learners needs. ICT tools allowed learners to learn at their own pace, to refer back to previous documents and provides many practice lessons which relate to the content learned.

On the flip side, it is quite challenging for young learners due to students' inadequate ICT skills. The learners in grade 1 and 2 are still young. 90% of them interact with the tablets and ICT tools for the first time in school, which makes it hard for them to manoeuvre

around using the software as they are not used to it, due to lack of ICT skills. their learning using the tablets takes much time to complete a lesson.

These students' low level of ICT skills requires them to spend much time with technological tools. Unfortunately, the time allocated for every lesson as per the school schedule is a limiting factor. These consequentially lead to ineffective learning. The observed challenge in this case was time; lessons that involve the integration of ICT need to be allocated with more time so that teachers and students can have time to learn as championed by Selwyn and Bullon (2002).

Conclusion

Synoptic underpinnings indicate that teacher needs time to plan for the lesson, prepare and set up technological tools. The larger classes need many technological tools and supporting teacher. At times the tools could be enough, but due to the server's inability to sustain many tablets online, only a few will be connected. These study findings showed that for teachers, teaching using ICT was challenging due to lack of infrastructure and ICT tools. These accession coincide with the research finding done by Bauer and Kenton (2005), Becta (2004), and Rich et al. (2010).

Lack of support, ICT training, few numbers of technological tools, teachers' lack of ICT knowledge and skills affect ICT implementation process. Primary school teachers can use ICT, but the above challenges hinder them. Finding solutions to these problems should be the next thing considered by teachers, school leaders, and government stakeholders. Besides, there is still hope for the effective and efficient use of ICT tools in Ugandan schools. The government via the Ministry of Education and that of ICT and National Guidance should consider involving all teachers in rigorous ICT training to gain adequate ICT knowledge and skills. Teachers should be motivated at the school level and also by the society on the excellent work they are doing. After minimizing the problems mentioned above, there will be positive outcomes in education through ICT.

Recommendations

The use of ICT in education is very beneficial to both teachers and students, as they both acquire ICT knowledge and skills, making learning real and enjoyable. ICT tools and software allow students to grasp difficult concepts quickly and complements learning especially for visual learners. Teachers' work is simplified since the learning software meets all learners' needs. For slow learners, also, the software allows students to learn at their own pace. Lesson planning materials and extra learning materials are accessible in the software. Additionally, classroom instruction delivery methods are

improved through the use of ICT tools. Nevertheless, the challenges reported in this study have to be solved otherwise the integration of ICT would be considered as the worst decision.

For practical use of ICT in schools to take place the following should be considered; ensure each child gets his/her laptop and be exposed to the laboratory; teachers need to have continuous ICT training sessions. There should be stable electric power supply in place. In case there are no laboratory technicians in school, the school should allocate teacher assistants to those classes using ICT tools to help manage a large number of students.

The government of Uganda via the Ministry of Education should address the issue of repairing faulty tablets as most teachers do not know who and how to address the faulty tablets. Due to inappropriate information, some schools are afraid of continuously using the tablets due to fear of damaging them.

The use of tablets in the classroom involves connecting to a server which is known as a content server. The content server has lower bandwidth that cannot support many tablets, the low bandwidth disconnects other tablets, and the loading process takes time. Stakeholders are encouraged to reconsider increasing the server bandwidth and strength for smooth learning of lessons.

There is a necessity to train all teachers in schools, head teachers and educational officials. This is because teachers need peer support when using technological tools. Education officials training is necessary since they are the individuals who assess teachers using ICT. Equipping them with the skills will be beneficial both to the school and the government, and this will lead to a reshuffling of the training content they expose teachers to. Most of them have no idea how the implementation process takes place. Unfortunately, those who could be sent to assess teachers do not have a theoretical idea of ICT use in teaching and learning.

Teachers should transform their mindset to embrace the use of ICT. They need to be open-minded to learn from their experienced colleagues in schools. Age should not hinder them from embracing ICT. Many old teachers are ICT technocrats, and they are managing very well with technological equipments. Arising out of the above accession, teachers have to change their perceptions, attitudes, and beliefs towards ICT by taking it as an opportunity to improve their pedagogical practice.

FUNDING

This study was supported by the Chinese Scholarship Council (CSC) Bilateral Program for Uganda and China.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Abas I (2009). Adaptive Behaviour Assessment System: Indigenous Australian Adaptation Model.
- Almas A, Krumsvik R (2008). Teaching in Technology-Rich Classrooms: Is There a Gap between Teachers' Intentions and ICT Practices? *Research in Comparative and International Education* 3(2):103-121.
- Andoh BC (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature Charles Buabeng-Andoh. *International Journal of Education and Development Using Information and Communication Technology* 8(1):136-155.
- Arnseth HC, Hatlevik OE (2010). Challenges in aligning pedagogical practices and pupils' competencies with the Information Society's demands: The case of Norway. In S. Mukerji and P. Tripathi (Eds.), *Cases on technological adaptability and transnational learning: Issues and challenges*.
- Barron A (1998). Designing Web-based training. *British Journal of Educational Technology* 29(4):355-370. <https://doi.org/10.1111/1467-8535.00081>
- Bauer J, Kenton J (2005). Technology integration in the schools: Why it isn't happening. *Journal of Technology and Teacher Education* 13(4):519-526.
- Becta (2004). A Review Of The Research Literature On Barriers To The Uptake Of Ict By Teachers British Educational Communications and Technology Agency, (June).
- Berge Z (1998). Guiding principles in web-based instructional design. *Educational Media International* pp. 72-76. <https://doi.org/10.1080/0952398980350203>
- Blatchford P, Bassett P, Brown P (2011). Examining the effect of class size on classroom engagement and teacher e pupil interaction: Differences in relation to pupil prior attainment and primary vs . secondary schools. *Learning and Instruction* (Vol. 21). London. <https://doi.org/10.1016/j.learninstruc.2011.04.001>
- Chigona A, Chigona W, Davis Z (2010). Motivating factors: Educators' use of ICT in schools in disadvantaged areas in the western cape. In *International Conference on Information Management and Evaluation*, Cape Town.
- Costin C (2017). What is the Role of Teachers in Preparing Future Generations?. *Meaningful Education in Times of Uncertainty* 40.
- Davis N (2003). Technology in teacher education in USA: What makes for sustainable good practice? *Technology, Pedagogy, and Education* 12(1):59-84.
- Ertmer PA, Otterbreit-Leftwich TA (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education* 42(3):255-284.
- Hamidi F, Meshkat M, Rezaee M, Jafari M (2011). Information technology in education. *Procedia Computer Science* 3:369-373.
- Higgins S, Moseley D (2011). Teachers' thinking about ICT and learning: beliefs and outcomes. *Journal of Teacher Development* 5(2):191-210.
- Hutchison A, Reinking D (2011). Teachers' Perceptions of Integrating Information and Communication Technologies into Literacy Instruction: A National Survey in the U.S.. *Reading Research Quarterly* 46(4):308-329.
- INTO (2017). ICT in Education: Policy, pedagogy and practice. In *Education Conference* P 36.
- Kiptalam G, Rodrigues A (2010). Accessibility and Utilization of ICTs among Secondary School Teachers in Kenya. In *The International Conference on Computing and ICT Research*. Uganda: Kampala pp. 246-263.
- Laronde G, MacLeod K, Frost L, Waller K (2017). A Case Study Of The Integration Of Information And Communication Technology In A Northern Ontario First Nation Community High School: Challenges And Benefits. *Journal of International Education Research (JIER)* 13(1):27. <https://doi.org/10.19030/jier.v13i1.9963>
- Liu Y, Szabo Z (2009). Teachers' attitudes toward technology integration in schools: a four-year study. *Teachers and Teaching: Theory and Practice* 15(1):5-23.
- Moges B (2014). The Role of Information and Communication Technology (ICT) in Enhancing the Quality Education of Ethiopian Universities: A Review of Literature. *Journal of Education Research*

- and Behavioral Sciences 3(8):246-258.
- Mutonyi H, Norton B (2007). ICT on the margins: Lessons for Ugandan education. *Language and Education* 21(3):264-270. <https://doi.org/10.2167/le751.0>
- Noor-ul-amin S (2017). An effective use of ICT for education and learning by drawing on worldwide knowledge , research and experience: ICT as a change agent for education (A Literature review). *Scholarly Journal of Education* 2(4):38-45.
- Obijiofor L (2009). Mapping theoretical and practical issues in the relationship between ICT's Africa's socio-economic development. *Telematics and Informatics* 17:15-31.
- Ofsted (2009). The importance of ICT: information and communication technology in primary and secondary schools, 2005/2008. london.
- Rich BL, Lepine JA, Crawford ER (2010). Job engagement: Antecedents and effects on job performance *Job Engagement: Antecedents And Effects On Job Performance*. *Academy of Management Journal* 53(3):617-635.
- Richard JA (2015). The role of higher education in the 21st century. *International Journal of Multidisciplinary Research and Modern Education (IJMRME)* 1(1):652-656.
- Selwyn N, Bullon K (2002). Primary school children's use of. *Journal of Educational Technology* 31(4):321-332.
- Stephen N (n.d.). Information and Communication Technology in Secondary Schools of Uganda : Examining the Trends and Hurdles *Communication Technology In Secondary Schools Of Uganda: Examining The*, 6247.
- Stoll L, Harris A, Handscomb G (2012). Great professional development which leads to great pedagogy : nine claims from research Autumn 2012. Great professional development which leads to great pedagogy: nine claims from research.
- Tedla BA (2016). Understanding the importance, impacts and barriers of ICT on Teaching and Learning in East African Countries. *International Journal for E-Learning Security* 2(2):199-207. <https://doi.org/10.20533/ijels.2046.4568.2012.0025>
- The Republic of Uganda (2012). National ICT Policy For Uganda First Draft September 2012, (September) pp. 1-53.
- UCC (2014). Integrating Ict Into Education in Uganda, (July). Retrieved from https://www.ucc.co.ug/files/downloads/ICT_Integration_into_teaching_and_learning_booklet_2014.pdf