

ICT USAGE IN TEACHING AND ITS' INFLUENCE ON STUDENTS' ACADEMIC PERFORMANCE IN UGANDA CERTIFICATE OF EDUCATION (UCE) IN KASESE DISTRICT

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ABSTRACT

This study investigated the ICT usage in teaching and its' influence on students' academic performance in Uganda certificate of education (UCE) in Kasese District, focusing on three major areas; accessibility of ICT in teaching, Utilization of ICT infrastructure on academic Performance in UCE in Kasese District, and to determine the knowledge and skills possessed by secondary school teachers of Kasese District in ICT. The study utilised a cross sectional design with a Chi-square test for analysis using 291 respondents.

The study discovered that the accessibility of ICT resources in teaching influence the academic performance of students, the utilisation of ICT Infrastructure influences students' Academic Performance in UCE secondary schools of Kasese District, and also, the teachers in Kasese District possess reasonable ICT knowledge and skills, although the coverage of ICT resources is still very minimal; something that affects learning in Ordinary Secondary Level in Kasese District. The study recommended for different stakeholders: Board of School Trustees, Teachers, and Government of Uganda through the Ministry of Education and Sports to provide ICT facilities in schools, train teachers in the district ICT knowledge and skills in order to improve the accessibility of ICT in the teaching and learning process in Kasese District.

KEYWORDS: ICT, Teaching, Academic Performance, Kasese District, and UCE

Introduction

The progress of Education world-wide and Uganda in particular has not merely happened unabatedly. A lot of interventions have been employed to try and improve on Education performance. Among other interventions like motivational allowance to staff in "hard to reach" schools, renovation of schools, ICT has been applied to improve on the performance of the education sector in Uganda and beyond. This study seeks to assess how ICT Usage in teaching influences students' academic performance in Uganda Certificate of Education, in Kasese District.

Background

Kasese District is one of the 134 Districts that constitute the Republic of Uganda. It's found in Western Uganda and borders the Districts of Bundibugyo in the North, Kabarole and Bunyangabo

Districts in the East, Kamwenge in South- East, Rubirizi in the South and bordered by Democratic Republic of Congo in the West, (Kasese District Local Government Report, 2018).

The invention and development of telecommunication in the world began in the 1830s (Olofinniyi, *et al*, 2012). The first commercial electrical telegraphy was constructed by Sir Charles Wheatstone, and Sir William Fothergill Cooke. They both devised as “improvement to the existing telegraphy,” and since then, Information and Communication Technology (ICT) has been rolled to education institutions to aid teaching and learning. There is an almost universal emphasis on teaching basic skills for software use and information gathering. For almost four decades, education policy makers both at international and national levels have been formalizing ICT policies as part of the education renewal and reform. For instance, at the international level, the policy for integrating ICT for development was first formulated in the Millennium Development Goals (MDGs) target 8.F, which states that, “in cooperation with the private sector, make available the benefits of new technologies especially Information and Communications” (United Nations’ Report, 2000; 2012).

UNESCO, (2000) Report confirmed that, ICT plays a pivotal role in achieving “Education For All” (EFA) goals; including broadening access, eliminating exclusion and improving quality. The Dakar Framework for Action paved way for future emphasis on learning to enable acquisition of life skills. This was emphasized in EFA goals three (3) and six (6). Goal.3 is ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life-skills programmes by 2015. Goal.6 aimed at improving all aspects of the quality of education, and ensuring excellence of all so that recognised and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.

The Dakar Framework for Action decision of highlight of EFA emerged and was supplemented and supported by the World Summit on the Information Society (WSIS), convened in 2003 and 2005 (Partnership on Measuring ICT for Development, 2011). The WSIS resulted into a clear commitment by Governments to foster the achievement of inclusive information society, which highlighted Ten (10) targets to be achieved by 2015. For instance, target two (2) and target seven (7) were promoting ICT in relation to Education. According to target two, both primary and secondary schools were to be connected to ICT as a pre-condition. This meant that all schools were to acquire ICT targets like radios, televisions, and computers as well as increasing internet access. Target seven aimed at adopting all primary and secondary curricula to meet the challenges of the Information society (Partnership on Measuring ICT for Development, 2011). Therefore, the idea of ICT adoption in EFA aimed at integrating ICT into subject learning which was deemed so far more effective for students, (Hennessy, *et al*, 2010).

Teaching and Learning has involved the use of computer software programs, schools use websites and emails, or computers to communicate to students online (internet), cell phones, projectors among others, and today computer usage pushes teachers to plan their lessons more effectively and make lessons more attractive to students, (Ramboll, 2006). This has improved learner outcome such as, behavior and motivation, (Condie and Munro, 2007).

For this, Gray, *et al*, (2010) in their study discovered that, 97% of the teachers in public primary and secondary schools in US in 2009 had one or more computers located in classrooms every (93% of them with internet access) and the ratio of students to computer in the classroom was 5.3 to 1. In Europe, at least 75% of the students had one computer per every four students in 2006. According to the European commission, (2013), computer coverage and network had been steadily increasing at all levels of Education by 2012. In Malaysia, for Mahathir, 2002: Becta, 2000: Cox, 1999, the government budgeted for ICT equipment like notebook computers, LCD projectors that were to be provided in form of grants to schools. ICT was sighted as a means of promoting greater collaboration among students that would encourage communication and knowledge thereby

increasing their motivation. Ittigson and Zewe (2003) cited that, technology is essential in teaching and learning. They added that, ICT improves the way some subjects like mathematics should be taught and enhances students understanding of basic concepts.

In Africa, the vigor to develop ICT had an exponential rise amidst the target of realising the Millennium Development Goals (MDGs) in the year 2000. Greenleaf, (1994), observed ICT as an effective tool in supporting teaching and learning. This was incorporated in policy making and implemented in Education curricula. To Hennessey, Harrison and Wamakote, (2010), the process of developing ICT in East Africa was painfully slowly, but had been improving. By 2011, the entire undersea cable was being installed around the Sub Saharan coast to enable connectivity and increased ICT utilisation.

In 2006, the Uganda government launched a National Information and Communication (ICT) Policy Framework that envisioned Uganda where national development broadly and human resource development more specifically would be achieved through efficient application of ICT and digital literacy (The republic of Uganda Report, 2006). In this regard, several initiatives have been launched to promote digital literacy and ICT integration in Educational institutions across Uganda, (Andema, 2009). The Ministry of ICT was also established to ensure ICT is integrated in the Education curricula to provide equitable access for all learners regardless of any education level.

Kasese District is not exception to Uganda's ICT policy. The National Education ICT curricula have been rolled to Secondary Schools in Kasese District. Computer laboratories with ICT infrastructure have been installed in some schools by the Ministry of Education, and other agencies like Uganda Communications Commission (UCC), Mobile Telecommunication Network (MTN), Development Partners and school initiatives. The government and some leaders have assisted to train teachers and learners to enable the use of ICT in the teaching-learning process with mixed challenges.

The ICT intervention in education is to promote e-learning (Bitner, N & Bitner, J., 2002) that is expected to improve students' academic performance in assessments including Uganda Certificate Education (UCE) done at lower secondary Education (O' Level). However, very few students pass with First grades compared to those that pass with other hind grades.

In Uganda, Secondary Education level forms the Post Primary Education level, (Education Act, 2008). The secondary section is one of the Departments of the MoES in addition to pre- primary, primary, BTVET and tertiary departments. The secondary department has other sub-sectors like private and government. Like primary, secondary have curricula designed at NCDC and examinations administered by UNEB.

Kasese District had 258 Government aided primary schools and 66 secondary schools that is; 18-government aided and 48-private, (2002 Population and Housing Census Report, 2005). The number of Secondary schools rose to 78 by the year 2016, (SESEMAT-Kasese Report, 2016). However, 22 were/are government aided, and 56 were/are private schools. Secondary Schools that have UNEB centre total to 52. The Uganda government developed a strategy for providing "Education for science and technology" in 2000. In 2003, the government developed an ICT policy in the education sector (The Republic of Uganda Report, 2006). This policy was to promote ICT for National transformation and to match with the global levels. Uganda was to capitalize on natural and human resources to improve the quality of life in a sustainable manner, thus technology is part of the evolutionary process to meet human needs.

At institutional level, the Ministry of Education and Sports has equipped secondary schools with computer laboratories and some with internet connectivity. This was to promote digital literacy amongst students and staff. Schools have developed ICT departments to assist in training staff and students. This was to promote knowledge and skills to make research and collaboration between teachers and students. However, they claim of limited access to computers, small computer laboratories, electricity outages, inadequate in internet connectivity and irrelevant material on internet. Instead of improving technology to promote research, guided discovery to students and academic performance, since the education system in Kasese and Uganda at large is driven by examinations than skills development (Muzaale, 2013). Amidst this, schools use theoretical approaches and since 2014, less than 10% of UCE candidates in Kasese District pass in division one and two. As examinations remain one of the measures of success for teachers and students, low grades could be altered by promoting the potential of digital literacy. The study will address the issue of ICT usage in teaching and its influence on students' academic performance in secondary schools in Kasese District.

2. 2. ICT Accessibility in teaching and students' academic performance

Realizing teaching-learning objectives means the learners develop more insight of what is taught and when practiced, they are expected to perform well academically or pass examinations in first and second grades. The use of Technology in Education has provided both students and teachers with unlimited number of efforts for learning. Arrange of studies have looked into why teachers avail ICT in teaching (Hennessy, Harrison and Wamokate, 2010:41). These studies portray the accessibility of ICT in teaching as being inherently advantageous. For instance, Tella, *et al* (2007) examined Nigerian secondary school teachers use of ICT in schools using a census of 700 teachers. The findings of his study showed that most teachers perceived ICT as very useful and as making teaching learning easier. I strongly agree with these findings above and maintain that if ICT is employed in teaching both teachers and learners will be motivated to meet their targets.

However, the Nigerian researcher assumed that all teachers are supposed to be ICT literate. Most schools have developed structures that favor the employment/accessibility of ICT while teaching. Despite ICT being prioritized in Ugandan schools and Kasese inclusive, why have we had more students passing in Division 3, 4 and 9 in Uganda Certificate of Education (UCE), Compared to the numbers in Division one(1) and two(2)? This means that, accessibility of ICT in teaching has not provided the solution to improving academic performance at UCE. This study need to find out whether other factors fail accessibility of ICT in teaching to influence academic performance or whether ICT has not been appropriately used to improve academics or what is really required to benefit from ICT in teaching as expected?

In trying to realize the MDGs and EFA as per the Dakar Framework for Action (UNESCO, 2000, and Partnership on Measuring ICT for Development, 2011), there developed a large public outlays for ICT in schools in many countries. There has also been an increase in literature trying to identify the effects of ICT at schools on learning. Most recent studies exploit the exogeneity of national or local programs aimed at increasing ICTs in schools and find either little or no effect (Cristia *et al*, 2012). In a related development, Machin, *et al* (2007), investigated the effect of a change in the rules governing ICT funding across different school Districts in England and found a positive impact on Primary school students' performance in English and Science, but not in Mathematics. Despite the fact that they did not specify how ICT was used, the results reveal that ICT availability or access in school have a significant influence in academic performance of students. The only challenge is that, ICTs influence academic performance variably from on subject to another.

Gregoire, et al, (1996), highlighted the access of cell phones during class time, cell phone technology continues its development and that device appears capable of contribution to students learning and improved academic performance. For example, modern “Smart phone” provide students with immediate capacities as an internet-connected computer such as online information retrieval file sharing and interacting with instructors and fellow students (Tao and Yeh, 2013). This means that a student that is accessible to a cell phone can acquire knowledge any time both in class and outside class environment. These assist to accomplish assignments by learners. This study is different from use of smart phones or cell phones in secondary schools. Cell phone accessible and utilization in teaching is not clear and the research intends to find out whether this technology is appropriate in Kasese district schools to improve academic performance.

According to Olakulehin (2007), there is need to develop ICT for education and ICT in education. The later involve developing ICT for teaching and learning purposes and the former involve general components of technologies in teaching process more specifically often training teachers in the use of technology in the teaching process, therefore, technology use creates a learner-centered environment by mobilizing learners, combining text, sound, color and moving images that enhance content for easy learning. This is possible through facilitating the acquisition of basic skills through drill and practice. This is better accomplished by education television broadcasts that teach literacy and numeracy at basic education level enhancing teacher training by improving access to the quality of teaching training.

With the above, ICT knowledge and skills increases learners’ self-trust and enables all-round learning that enable not only better academic performance but also self-reliance ability.

Access of ICT infrastructure in teaching promotes effectiveness in leaning as well as reducing the risk of science chemicals from science experiments in schools. On this, Nakajubi (2017), put it that, Cyber laboratories serve as alternative to hazardous chemicals used in science experiments. A big ray of light is projected on the wall. A student, with guidance of a teacher, shows the rest of the class the results of chemical combinations. But different from the usual traditional laboratory, the practical here are being handled using cyber technology – a computer, a projector and software. It is e-learning, where the syllabus for all students’ practical is just fed into a computer and at the click of a button, the chemical combinations or any other practical is relayed on the wall”.

A cyber technology is e-learning model, which according to proponents, is making learners understand and conceptualize the different subjects in a simple and visualized manner. Unlike traditional laboratories, no chemicals are used in cyber laboratories. The risks and massive costs which underlie traditional school laboratories, but as a solution; the Education Ministry started cyber laboratories in schools since 2012. It covered 800-1200 government schools. It’s true that cyber laboratories have promoted access of ICT resources and enhanced e-learning in science subjects in secondary schools (Nakajubi, 2017). This is advantageous in that it motivates student to learn and reduce the effects of using dangerous chemicals. However, cyber laboratories were not availed to all secondary schools in Uganda. A few government secondary schools were considered leaving out others as well as all private secondary schools. Also, where cyber laboratories existed, it was not guaranteed that all science teachers possessed the ICT skills to operate ICT gargets like computers, projects and other related software. This implies that fully e-leaning was not enabled in secondary schools by the cyber program.

A study of ICT in Asia, reveal its access or integration in the national education curricula (UNESCO, 2014). ICT is ubiquitous in high-income or developed countries, while in many

developing countries, its integration and use especially more advanced forms of ICT and broadband connectivity- often lag behind other social and economic spheres, including general communications, employment and commerce. As a consequence, children and youth in these countries frequently learn more about how to use ICT informally outside the school system than in the classroom.

Nevertheless, as the access of ICT in education rises and evolves with evermore sophisticated tools, participation and transition rates to higher levels of education increase children and adults will increasingly need to develop digital literacy, not only for life skills but also to support their education throughout the secondary, post-secondary and tertiary levels. The ever integration of ICT into primary and secondary curricula through formal recommendations is therefore vital and more acts as an important level for ensuring the introduction and implementation of ICT into educational institutions and classrooms. Where ICTs are absent in households, learning basic computer skills or computing is important for lifelong learning (UNESCO, 2014).

In a related development, Moursund, D. (2005:56), explores the idea of ICT as curriculum content in pre-college Education. The focus is on discipline in its own right. This discipline is often called computer and information science. Moursund referred ICT as a discipline-specific content of non-ICT disciplines. For example, one of the winners of the 1998 prize for his previous 5 years of work in computational chemistry. By early 1980s “computational” had begun to be an important part of the content areas in many different disciplines, including the entire core curriculum areas: language arts, mathematics, science and social science. On this Samuel Johnson (Moursund, 2005) emphasized that;

Knowledge is of two kinds. We know a subject ourselves or we know where we can find Information upon it.

This implies that ICT assists many people including teachers and students to unveil knowledge which they may not be having at a time.

Moursund. D (2005), added that ICT serve as a Generic tool that tend to cut across all or most disciplines. Essentially, all the generic tools have become commonly used tools in language arts, mathematics, science and social science. ICT promotes Computer-Assisted Learning. ICT is now widely used in all of the core fields of study and in most other disciplines. From the above, one cannot be mistaken when he or she qualifies ICT as an aiding tool in achieving multi-disciplinary approach to teaching-learning and therefore determine the effectiveness or extent in which other discipline can achieve or perform.

In 2014, more than one-half of the Asian countries courses on basic computer skills had been integrated in lower secondary and upper secondary levels of education in some cases despite capacity to meet the national curricula (UNESCO, 2014). For example, the available resources in developed countries such as Singapore, Japan and New Zealand are adequate to meet objectives, while Bangladesh faces challenges to universalize access to basic computer skills or computing in schools. In countries that do not have basic computer skills at all levels, emphasis is placed on secondary education. For instance in Armenia, Bhutan, Lao People’s Democratic Republic and the Philippines, basic computer skills and computing are emphasized beginning in lower secondary education, while in Cambodia, Myanmar, Nepal and Sri Lanka this occurs in upper secondary education. In Kyrgyzstan, a course in basic computer skills or computing occurs specifically at the lower secondary level (ADB, 2012).

However, despite the fact that ICT skills were emphasized in the education curricula of most Asian countries, it’s not clearly spelt out the extent to which they influence academic performance in schools. In some cases, ICTs were home based than classroom oriented especially where resources were available. This implies that ICTS had little or limited influence on academic performance of

school going students. Also, access of computer skills in developing countries of Asia, is not well distributed compared to developed ones. This implies that there's a variation of its influence on academic performance of various schools as this is the focus for this study.

ICT Utilization and academic performance in Secondary Education

The current modern societies especially the young that form a digital generation diffuse and incorporate ICT in their operations. This makes it clear that ICT will affect the complete learning process today and in the future, Davis, N. (2003). Technology is of increasing importance in peoples' everyday lives and that presence will most certainly increase in the coming years. No longer relegated to specialized work place setting, Information and communication technologies have become increasingly common in community settings, at school and at home, Drenoyianni, H. (2004). ICT should be addressed in the design and development of learning environments, Joy, E.H., et al.. (2000). This research however needs to establish whether ICT is utilized in teaching – learning to influence academic performance as done in other fields.

In a bid to determine the magnitude of ICT infrastructure in influencing academic performance, few studies have gone beyond the analysis of the effect of the availability of ICT equipment and looked at the role of computers to teach, for instance, using specific soft ware programs to promote learning in Uganda. These studies often employ simple dichotomous variables capturing the usage of Computer- Aided Instruments (CAI) and generally find no statistically significant effect on students' Academic Performance, Newhouse, (2002). From the findings of the study above, one cannot wholesomely underrate the effect of ICT infrastructure especially in the current secondary school Education where science subjects that are aided by mathematics that indicated the influence of ICT infrastructure in Academic Performance are compulsory and the extent of ICT infrastructure involvement is not clearly measured in the study.

According to UNESCO (2014), infrastructure to assist or support the integration of ICTs in education institutions require electricity and telecommunication facilities. To support teaching and learning, as well as education management, variety of ICT- assisted instructional approaches may be implemented, ranging from the use of radio or computer, internet newly-emerging mobile devices (UNESCO, 2014). Newer battery- operated ICTs are emerging, in addition to mobile devices that they may be recharged off-site, the majority of ICTs including television, computers and the internet continue to require a more stable energy source. To summarize, the integration of ICT into schools requires electricity for example, grid/mains connection, wind, water, solar or fuel-powered generator that is readily available. This implies that some schools located in areas not connected to sources of power supply do not utilize ICT resources since they require availability of power. Also, affordability of sources for energy as well as telecommunication facilities is not an easy task for most educational institutions in Uganda. This explains limited accessibility and utilization of ICT infrastructure/targets in some of the secondary schools in developing countries like Uganda.

UNESCO, (2014) put it that, “the key determining factor for electricity in Most Developed Countries (MDCs) is location”. Rural, remote and mountainous regions are frequently neglected in building up national infrastructure, resulting in a lack of power supply to support ICT in education. In developed and middle income countries, electricity is universally available in primary and secondary schools (UNESCO, 2014). This general availability of electricity implies that electrical infrastructure is generally in place to integrate ICT in the classroom thus directly influencing academic performance in schools.

ICT applications assist to solve recurrent problems (Celebic. and Redulic, 2011:14), some utility programs help users to perform different tasks or for solving problem for instance both teachers and students have used common utility software as text processing software for creating and forming text documents and nowadays, they can contain image, charts and tables. Spreadsheet calculations software is used for performing various calculations and presentation of results in carts.

Presentations that consist of slides with graphical and textual element, such presentations can afterwards be displayed as a “Slide show” specialised work place setting, information and communication technologies have become increasingly common in community settings, at school and at home, Russell, M., et al.. (2003).

The utilization of ICT common utility software assists teachers to transfer knowledge to students and students to transfer knowledge to what is taught. However, what remain acknowledge is to whether most Ugandan schools have attained a level of developing common utility software for use during teaching and learning process. Also, if schools pose them, at what extent are they put to use? This study need to find out the nature and extent to which ICT information are utilized in schools.

More evidence on ICT-related practices requiring students’ active involvement demonstrates that teachers usually do not fully exploit the creative potential of ICT, for instance engaging students more actively in the production of knowledge (Balanskat *et al*, 2006).The active use of ICT by students during lessons actually opens unexplored horizons in the student-teacher relationship. This implies that ICTs creates a hands-on lesson where both the student and the teacher get involved in connecting or ensuring functioning of ICT infrastructure. This student-teacher rapport is result of utilization of ICT infrastructure and on one hand the textual and audiovisual effects make lessons more complete and attractive to as well as ICT helping teachers to customize their teaching more effectively. Also, in an evaluation of the “Laptops for teachers” program in British Government in 2004, teachers who had been equipped with laptops report having extended their ability to access resources and having saved time in lesson planning and preparation. Condie and Munro (2007), added that, teachers utilizing of ICT infrastructure for example while preparing their lessons online, make them believe the positive effects it has on the quality of teaching. However, teachers’ access to ICTS like laptops in Kasese and Uganda at large is not something obvious. Also, not all who access the have the ability, knowledge and skills of utilizing laptops to effect teaching and learning in schools? Therefore, for mutual benefit of the teaching –learning process, the mind-set for teacher has to be positive and they be equipped with both ICT equipments and skills of utilizing them.

The internet is increasingly becoming a key medium for accessing knowledge resources. It allows the public to access online data base of scientific research results, digital media publications and free training and learning resources (Federal Ministry for economic cooperation and Development, 2013). This makes internet a critical resource for improving education particularly vocational and higher education and scientific research. ICT opens up new avenues for learning and provides valuable instruments for exchanging and managing knowledge. ICT supported distance learning approaches create new opportunities for further education and training, in the form of e-learning and blended learning formats (Federal Ministry for Economic Cooperation and Development, 2013).

Despite the usefulness of ICT and Internet in particular, the network availability in all schools is not certain. Also, where it exists, its maintenance and affordability is not clearly known. This study need to establish whether ICT and internet have benefited the teaching learning environments in schools.

Schools have always lagged behind in technology. For this for example, reports from America show that computers are more likely found in Sub-Urban schools than the poor inner city or rural schools Barron, A., et al.. (2002). In relation to this, the researcher wonders to whether Uganda, a

developing poor state has sufficient number of computers to utilize and improve academics in all secondary schools. This study is emphasized to develop a stand on this identified gap.

Brown C. & Czerniewicz, L. (2007), put it that “Students need to learn how to use computers, as today’s world run on computers. They continue to argue that, computer illiterate people have disadvantage in work, leisure and daily life. As students are prepared by teachers and schools to live, work and survive, computer literacy becomes the best option to go. However the effective utilization of ICT infrastructure depends on the training for both teachers and students. This research to acquire information about ICT is used in secondary schools for student’s to influence academic performance.

Some students think and prefer ICT usage typically for leisure rather than Education. To some students however, computers are used to research, read, send emails, get computer lessons, store information and play games Therefore computers can be ineffectively or effectively used to influence students’ academic performance. This research therefore, needs to find out the purpose to which ICT Infrastructure and hardware is handled in schools by both students and teachers to influence academics.

Several schools do not have enough science teachers and others lack both science and computer laboratories, Businge .C., (2017). Government of Uganda in 2012 piloted a cyber technology laboratories project in almost 800 government schools. These high technology laboratories are a good addition to schools which hard traditional laboratories. But, considering that there are more private schools than government owned ones, most secondary schools are still struggling with poor laboratories, Businge C., (2017). This means that efforts to promote the teaching of science seem not adequate. The duty lies with parents and government to ensure that teachers are hired and laboratories are built and utilized.

In some schools, computers are misused, Lule, J. A., (2017). Some people including both teachers and students are accused of cases of computer misuse. The police and the national regulatory body UCC, arrested 14 people on 27th October, 2017 in connection with various crimes, Lule, J. A., (2017:8). According to the UCC Executive Director, Geoffrey Mutabazi, incitement of violence was the commonest offence. Mutabazi argued that, inspite of the warning of public against misuse of social media, there is a growing concern about increasing use of social media and electronic media (ICT) to perpetrate crimes”. The crimes include offensive communication, libel, hate speech, sectarianism, inciting public violence and pornographic content among others. This means that instead of utilizing ICT resource to boost academics, teachers and students misuse it to perpetrate crime in communities.

Businge.C, Mutegeki.G and Omona.C (2017) put it that, technology lead to leakage of examinations. Some of the UNEB are easily shared on social media. Emphasizing this, Michael Mukasa, a retired Secondary School teacher says;

“Examination leakages given the Technology might become rampant and there is need to get tougher with invigilators, scouts and teachers. Those days, it was difficult for students to even have a phone and therefore, the leakage was limited”.

He explained: “This time, one person gets a question paper and within twenty seconds, a lot more people will have it. In this case, all sources of leakages must be wiped out completely”. This explanation from the retired secondary school teacher reveals that, ICT is negatively utilized to promote copying of examinations than improving the competences for students’ academic performance. From the above, misuse of ICTs may reduce academic performance of students. This

is because some students may not concentrate to improve their academic performance but rather trust that they will use social media like smart phones to copy examinations.

Computers in some schools are used by administrators, class teachers', students and parents. They serve as information systems or a set of interrelated components that collect, process, store and distribute information to support decision- making and control in an organization. Some scholars, like Hoffman, (2008), emphasize that information systems consists of components that interact to achieve the objective of providing information about day-to-day activities by managers to allocate resources and establish long-range business plan. Information systems comprise of components namely: people, procedures, software, data and connectivity. This allows computers to connect and share information, thereby greatly expanding the capacity and usefulness of information systems. This therefore implies that computer can be utilized by both administrators, teachers, students and parents of schools to register students, assign streams, analyze results, make reports and send emails to promote an Online Result Management Information System (ORMIS). ORMIS help to reduce operation costs for schools, time spent on processing, analyzing and getting access to student results which help to improve academics in schools.

2.4. Teachers' ICT knowledge and skills.

The use of ICT in teaching in schools is reliant on teacher's level of knowledge and skills to operate ICT gadgets/ equipment. Many school leaders still perceive the lack of ICT-related knowledge of teachers as a major obstacle to realization of ICT related goals, Pelgrum, (2002).

This research intend to "clear the air" on this issue above. If lack of ICT knowledge and skills is sincerely and obstacles, then appropriate measures or solutions will be proposed to schools and the education ministry at large.

Fabry, D. & Higgs, J. (1997), argues that the biggest drawback is teacher's lack of skills and expertise with new technologies in the Third world countries. However, in some schools like in Uganda, teachers use computers to type tests and examinations. Studies conducted reveal that, only 9.4% of the teachers use computers to teach content, fewer than 42% of them had training.

From the finds above, the percentage of teachers' ICT skills is still below half (50%) in Kasese District.. This calls for attention on what could be done to improve this situation in schools, how should it be approached and who is responsible? This study intends to find out the current ICT knowledge ability and skills possessed by teachers and give recommendation.

In reflecting the growing importance and ubiquity of new technology at work, Education and everyday life, ICT literacy was to be included in the domains for assessment in the programme for international students Assessment (PISA) if suitable assessment framework and appropriate test can be developed. ICT literacy (International ICT Literacy Panel, 2001-2011) is using digital technology, communication tools, and/or network to access, manage, integrate, evaluate and create information in order to function in a knowledge society. According to the panel, ICT act as a transformative tool whose application assist in developing capacity in improving the quality of people live by improving the effectiveness ICT literacy stimulates transformation knowledge and skills which must be acquired through education and training and finally improve quality of the workforce of the future. In this read, the teachers as drivers of the teaching and learning process are by all means required to process the knowledge and skills of ICT (ICT literate) to fully transform education. This research need to establish the truth of this in secondary schools in Kasese district that is, if existent to what level and if lacking why?

The success of ICT access and utilization for academics of secondary schools is highly reliant on the attitude and preparedness of teachers (UNESCO, 2014). This is due to the fact that,

Teachers are frequently considered to be the most important influence on classroom learning and, as such, play an invaluable role in ensuring that pupils use ICT effectively inside the school. However, there has been little or no research on exactly how much teacher training is required, how often it should take place, what kind of training is most appropriate and affordable, and what it should cover to create a teaching workforce that is motivated to use ICT in the classroom in the context of new curricula and new pedagogies.

Complicating matters, in some Countries in Asia, the integration of ICT into education is frequently resisted by some teachers and their unions, particularly in countries with an aging, underpaid teaching workforce, and where there has been inadequate training and preparation. In these circumstances, a lack of motivation to learn new skills and teaching and learning methodologies may occur, which is often compounded by feeling threatened by newer forms of ICT that students will understand better than teachers do. This concern has been recognized by the Ministry of Education in Kazakhstan, owing to the high proportion of “older” teachers in the last quartile of their teaching career. In particular, Kazakhstan has concerns about a general lack of efficiency in the use of e-curriculum, which is an important focus in their education system (ADB, 2012). This situation is true with the Ugandan situation especially where teachers are not trained ICT skills from Teacher Training Institutions (TTIs). Limited or lack of training for teachers in TTIs, lead low knowledge and skills in ICT. This in-turn lead to limited utilization of ICT resources for the benefit of teaching and learning in some secondary schools in Kasese and Uganda at large.

Businge. C (2016: 26-29); “the skilling Uganda project has a massive potential to cushion our country’s need for job creators rather than job seekers”. Since the curricula of the 21st century focus on ICT skills to construct new knowledge and engage in lifelong learning (UNESCO, 2008) there’s need to strengthen training /teaching of ICT in teacher training institution allover Uganda. This study intends to establish the ICT knowledge and skills possessed by teacher in secondary schools in Kasese District.

The Government of Uganda through the MoES need to ensure secondary schools are provided with computer laboratories as well as the human resource to utilize and sustain them. According to Businge.C (2017), MoES need to provide more science teachers and laboratories to school and trained teachers to handle science. Emphasizing this, Businge stated;

“Several schools do not have enough science teachers and others lack laboratories. Education Ministry’s 2016 annual sector review report shows that there is need to hire 4000 more science teachers to fill the void”.

Government in 2012 piloted a cyber – technology laboratories project in almost 800 schools. These high-technology laboratories are good addition to schools which had traditional laboratories. But considering that there are more private schools than government owned ones, most secondary schools are still struggling with poor laboratories. This means that the effort to promote the teaching of science including ICT seems note adequate.

This calls for concerted effort between the secondary schools parents, Boards, and Government, to ensure that teachers are hired and laboratories built if ICT knowledge and skills are to be realized.

Users of computers/ICTs including teachers need to acquire knowledge and skills that enable them apply all Software (Utility programs) in ICTS (Celebic.G, Rendulic. D. I, 2011). Utility programs refer to all programs that users use to perform different tasks or for problem solving. Users, according to his/her needs, install the appropriate utility software. Computer functions and tasks that computers can perform are defined by the installed utility software. Utility software can often cost more than computer hardware unless the software is open source.

Common utility software is text processing software, spreadsheet and presentation.

Text processing software is used for creating and forming text documents and nowadays, they can contain images, charts and tables. Examples of such programs are OpenOffice.org Writer (open source software) and Microsoft Word (proprietary software).

Spreadsheet calculations software is used for performing various calculations and presentation of results in charts. Examples of such programs are OpenOffice.org Calc Writer (open source software) and Microsoft Excel (proprietary software).

Software for presentations is used to create professional presentations that consist of slides with graphical and textual elements. Such a presentation can afterwards be displayed as a "slide show" by using a projector. Examples of such programs are OpenOffice.org Impress (open source software) and Microsoft PowerPoint (proprietary software).

This implies that teachers to successfully use ICTs like computers and projectors in teaching should have the knowledge and skills to apply all soft ware/utility programs and absence of the same, mean inability to utilize ICTs in teaching-learning in schools.

In conclusion, the literature reviewed shows that ICT is a basic requirement in all aspects of life and equally accounts in the attainment of education. Its limited access in teaching, its limited utilization in Schools and teacher's insufficient ICT knowledge and skills, jeopardize the effectiveness, efficiency and productivity in the education sector. In this study, much focus has been put on the extent to which accessibility of ICT in teaching, Utilization of ICT infrastructure in Schools and possession of ICT knowledge and skills by teachers, influence academic performance for students of Uganda Certificate of Education (UCE), taking Kasese District as a case in point.

RESEARCH FINDINGS

ACCESSIBILITY OF ICT IN TEACHING AND STUDENTS' ACADEMIC PERFORMANCE IN UCE IN KASESE DISTRICT.

The study attempted to determine the extent to which the accessibility of ICT in teaching influences students' academic performance in UCE in Kasese District. The research hypothesis states that there is a relationship between accessibility of ICT in teaching and students' academic performance in UCE in Kasese District. The null hypothesis also states that there is no relationship between accessibility of ICT in teaching and students' academic performance in UCE in Kasese District.

To test this hypothesis, the researcher used chi-square test to obtain the results below;

Table 1.1 cross tabulation of results showing the observed and expected frequencies for hypothesis one on whether ICT Accessibility in teaching has an influence on students' Academic Performance in UCE in Kasese District.

ICT Access in teaching influence students' Academic Performance in UCE in Kasese District.				
Response	Agree	Disagree	Not sure	Total
Count	97	160	20	277

Expected count	97.0	160.0	20.0	277.0
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The table 1.1 shows that out of the 277 respondents, 97(35%) agreed, 160(57.8%) disagreed while 20(7.2%) respondents were uncertain. To establish whether students' Academic Performance in UCE in Kasese District is dependent on ICT access in teaching, Table 1.1 indicates the results using Pearson chi-square test. The results for the Pearson chi-square test for these aspects highlighted above in this study are shown as;

Table 1.2 Chi-Square Tests - Accessibility of ICT& Academic Performance

	Value	Df	Asymp. Sig.
Pearson Chi-Square	140.429	132	.292
N of Valid Cases	277		

Basing on the results in Table 1.2, the calculated value of the chi-square was 140.429, the respective degree of freedom was 132 and the significance level of the association between accessibility of ICT and academic performance is 0.292. This is above 0.05 implying that there is an association between accessibility of ICT and students' academic performance in UCE in secondary schools of Kasese District. The finding in table 1.2 above, disagree with the null hypothesis and therefore agree with the first objective for this study that; accessibility of ICT in teaching has an association or influence on students' academic performance in Uganda Certificate of Education in secondary schools of Kasese District.

After rejecting of the null hypothesis, it was necessary to conduct further testing for the association to determine the extent of significance between the two research variables that's to say, Accessibility of ICT in teaching and students' Academic Performance in UCE. The results for this test of influence are presented in table 1.3 below;

Table 1.3: Strength and direction of influence - Accessibility of ICT onto Academic Performance

	Value	Approx. Sig
Nominal by nominal contingency coefficient	0.149	0.030
Number of valid cases	277	

Results in Table 1.3 indicate that Accessibility of ICT has a significant influence on students' Academic Performance in UCE in secondary schools of Kasese District. This is based on the Nominal by Nominal contingency coefficient of 0.149 at significance level of 0.030 (Sig < 0.05). These results mean that 14.9% of the changes in students' Academic Performance in UCE for secondary schools in Kasese District are explained by the level of accessibility of ICT in these schools. This explanation is statistically significant.

Research finding from chi-square test were supported by qualitative data from the respondents on interviews when asked whether ICT assist teachers to enrich their lessons. One male teacher replied;

IT enables both students and teachers to make their research on the internet in our school computer laboratory. Internet enables both teachers and Students access online resources. ICT has enabled my lessons to balance Theory and practical.” (Interviewed on 29th august, 2019)

While another male teacher in the age bracket of 21-30 who had served between 6-10 years replied, “ICT resources act as teaching and learning aids in some of my lessons. They enable us conduct research and serve as instructional material in class and therefore help to move my lessons.”(Interviewed on 2nd October, 2019)

The responses from the interview show that, ICT access in schools is significant in determining Academic Performance of students in Kasese District.

Further, an interview with a female student showed the significance of accessibility of ICT in determining Academic Performance. When asked how ICT influences lessons and studies, She responded thus;

“ICT equipments like projectors and computers attract my attention in class. Even after the lesson, a mental map is made about what was projected and therefore I remember what the teacher was handling. If all teachers could use those IT equipments, learning would be more than what takes place.” (Interviewed on 3rd August, 2017)

From the above, one gets it that accessibility of ICT in teaching broadens avenues for students learning and therefore influence Academic performance in UCE schools of Kasese District as indicated by the significance level in table 1.3 above.

UTILIZATION OF ICT INFRASTRUCTURE AND STUDENTS’ ACADEMIC PERFORMANCE IN UCE IN SECONDARY SCHOOLS OF KASESE DISTRICT.

In this section the study sought to find out the extent to which utilization of ICT infrastructure influence student’s academic performance in UCE in secondary schools of Kasese District”. The research hypothesis stated that, “there is a relationship between utilization of ICT infrastructure and student’s academic performance in UCE in secondary schools of Kasese District”.

The null hypothesis states that, “there is no relationship between utilization of ICT infrastructure and student’s academic performance in UCE in secondary schools of Kasese District”.

To test this hypothesis, the researcher used chi-square test and obtained the results below;

Table 1.4 showing the cross tabulation of observed results and expected frequencies on whether Utilization of ICT infrastructure in teaching has an influence on students’ Academic Performance in UCE in secondary schools of Kasese District.

Utilization of ICT infrastructure in teaching and students’ Academic Performance in UCE in Kasese District.				
Response	Agree	Disagree	Not sure	Total
Count	126	143	8	277

Expected count	126.0	143.0	8.0	277.0
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Table 1.4 above shows that out of 277(100%) respondents, 126(45.5%) agreed, 143(51.6%) disagreed and 8(2.9%) were undecided. To establish whether Utilization of ICT infrastructure determine students' Academic Performance in UCE in secondary schools, chi-square tests were conducted as shown in the table 1.5 below;

Table 4.3.2: Chi-square - Utilization of ICT& Academic Performance

	Value	Df	Asymp. Sig.
Pearson Chi-Square	83.831	88	.606
N of Valid Cases	277		

Basing on the results in Table 1.5, the significance level of the association between utilization of ICT infrastructure and academic performance is 0.606. This is above 0.05 implying that there is an association between utilization of ICT infrastructure and academic performance of students in UCE in secondary schools of Kasese District.

After ascertaining the association between the research variables, there was need to check or measure the magnitude of the relationship between Utilization of ICT infrastructure in teaching and academic performance of students in UCE in secondary schools of Kasese District. This test of influence was carried out as part of the chi-square test. The results of this test of influence are presented Table 1.6 below;

Table 1.6: Strength and direction of influence - Utilization of ICT on Academic Performance

	Value	Approx. Sig
Nominal by nominal contingency coefficient	0.135	0.037
Number of valid cases	277	

Results in Table 1.6 above indicate that Utilization of ICT infrastructure has influence on the Academic performance of students in UCE schools in Kasese District. This is based on the Nominal by Nominal contingency coefficient of 0.135 at significance level of 0.037 (Sig < 0.05). These results mean that 13.5% of the changes students' academic performance in UCE in secondary schools of Kasese District is explained by the level of utilization of ICT infrastructure in these schools. This explanation is statistically significant.

What type of Knowledge and skills is possessed by teachers in ICT in secondary schools of Kasese District?

To answer this question, the study utilised descriptive statistics and the findings are presented in Table 1.7 below;

Table 1.7: Knowledge and skills possessed by Ordinary Level teachers in Kasese District

	Agree	Disagree	Undecided	Mean	SD
I hold a degree in ICT.	54	41	2	3.268	1.71704
	55.67%	42.27%	2.06%		
My school environment has ICT resources like computer, Computer laboratories, projectors, internet etc.	15	77	5	2.083	1.20477
	15.46%	79.38%	5.15%		
I use internet to compare my notes with other institutions.	45	48	4	3.144	1.57447
	46.39%	49.48%	4.12%		
Share resources from one computer to another	48	45	4	3.186	1.48836
	49.48%	46.39%	4.12%		
My school organizes refresher ICT courses/trainings/ workshops for its teacher's at least once in a term.	53	42	2	3.361	1.49433
	54.64%	43.30%	2.06%		
I use school e-mails when communicating to fellow staff and students.	69	24	4	3.825	1.39202
	71.13%	24.74%	4.12%		

Source: Primary data (2019)

Basing on the findings in Table 1.7, it is not clear whether the teachers have a degree in ICT though there are a few who have (mean = 3.268). This is supported by response from one of the respondents when asked; Do you use ICT resources yourself in a lesson? If no, what reason has prevented you? One female teacher answered;

“I have not used ICT resources in any lesson in class. I am prevented due to lack of skills in ICT.” (Interviewed on 2nd September, 2019)

This was supported by a response from one female student in the age bracket of 16-18 years when asked on whether her teachers use ICT resources while teaching? She responded that;

“Some teachers don’t know how to operate computers. The role of ICT would be much on Academics in our school, if all our teachers knew how to operate ICT gargets”. (Interviewed on 28th august, 2019)

The responses above conquer with the findings where teachers with degrees with mean of 3.268 and only 55.7% of the teachers had ever trained to acquire ICT skills.

In addition, the findings indicate that school environment for most (almost all) schools in Kasese District is not composed of resources like computers, computer laboratories, projectors and internet (mean = 2.083). These results concur with the earlier results in the background information section (4.1) of these findings where majority of students indicated not to be having any computer lessons. Some respondents linked absence of ICT resource to lack of electric power supply. This is supported by words from a Head teacher of one of the secondary schools in the area of study who put it that;

“Our school was given thirty computers by UCC in conjunction with Ministry of Education and Sports in 2015. However, they were taken from us and given to another secondary school outside Kasese District. We were told to wait for another consignment/ batch that use solar power due lack of connection to an electric power grid. This explains absence of ICT resources like computer in most of our schools. (Interview on 1st September, 2019)

Most schools in Kasese District do not organize or conduct ICT trainings for their teachers (mean 3.361). When asked on whether their school normally conducts ICT training for staff/teachers, one of the male teachers who had served his secondary school for more than ten (10) years responded that;

“Lack of skills to operate computers due to lack of training. I therefore don’t even have an email account, because I cannot access it.” (Interviewed on 5th October, 2019)

This explain why only 15.5% of the secondary schools environment lack ICT resources as over 43.3% of the teachers lack operational skills for ICT equipments due to lack of training.

On a general note therefore, teachers in secondary schools in Kasese District do not have access to computer. Those that have access do not have much knowledge and skills to fully utilize the ICT in advancing academic performance for students.

CONCLUSION

From the above findings, the study made the following conclusions;

There is a statistically minimal association between accessibility of ICT in teaching and students’ academic performance at UCE in Kasese District. Therefore, the accessibility of ICT resources in teaching influence the academic performance of students of UCE in Kasese District by 14.9%.

The utilisation of ICT Infrastructure influences students’ Academic Performance in UCE secondary school of Kasese District by 13.5%.

55.7% of the teachers in Kasese District posses ICT knowledge and skills knowledge and skills is being increased as evidenced by 54.64% having refresher courses at their respective schools. Coverage of ICT resources is at 15.46%, something that affects learning in Ordinary Secondary Level in Kasese District.

RECOMMENDATION

The study recommended that;

The management and Boards of secondary schools in Kasese District should ensure that ICT resources are available for easy accessibility to both teachers and students to increase on the students' Academic Performance in UCE at a level beyond the current 14.9%.

To encourage utilization of ICT infrastructure, the Ministry of Education and Sports (MoES) of the Republic of Uganda should sensitize both students and teachers to enable them develop positive attitudes for them to embrace the e- technology/ e-learning. The education goal of providing education for science and technology should be highlighted and ICT equipment should be provided to secondary schools by government. This should be accompanied by serious school inspection and equitable power distribution by Government.

Teacher training institutions (TTIs) and universities should incorporate ICT training within the syllabus and curricular so as to produce Secondary Teacher graduates who are ICT literates and enable teachers to develop the required knowledge and skills to A-level beyond 55.67%. This will empower teachers to easily pass the acquired ICT knowledge and skills on to the secondary schools going students.

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