

IMPACT OF ICT ON TEACHING AND LEARNING PROCESS IN SECONDARY SCHOOLS IN UGANDA: LITERATURE REVIEW

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Abstract: The invention of Information and communication technology has made tremendous changes in the present-day world. The advent of Information and Communication Technology (ICT) has revolutionized the world in many ways, including education. In the past, classrooms were typically filled with chalkboards, textbooks, and lectures. However, as technology has advanced, so has our ability to incorporate it into the classroom. ICT has brought about a paradigm shift in the way teaching and learning are carried out in schools, colleges, and universities. The use of ICT in teaching has enabled teachers to create a better learning environment for students, making it easy for them to grasp complex concepts and ideas. This write-up explores the impact of ICT in teaching and learning and how it has transformed education. No area has been influenced by this digital phenomenon. The advent of ICT in education helped to improve the quality of education where teaching and learning eventually became an engaging active process related to real life. Active and collaborative learning conditions facilitated by ICT help to develop a knowledge-based student community. This gives an overview of the use of ICTs in the field of education focusing on its impact on the teaching-learning process, quality and accessibility of education, motivating learners, learning environment, and student's academic performance. It includes both the positive and negative impact of ICT on teaching and learning in schools. Discussion on the impact is thoroughly done and recommendations are given in this paper. The literature review highlights the positive impacts of ICT on teaching and learning in secondary schools in Uganda. It explores the integration of ICT in classrooms, access to digital resources, e-learning and blended learning, and teacher professional development, as well as the challenges faced. Understanding the benefits and challenges of ICT implementation in this context is crucial for policymakers, educators, and stakeholders to design effective strategies and support systems to enhance teaching and learning outcomes in secondary schools across Uganda.

Keywords: ICT, Impact, Teaching and learning.

1. INTRODUCTION

The term Information and Communication Technology (ICT) is a broad and comprehensive expression. It is not restricted to computers or the internet alone. It ranges from the use of FM radio to satellite for communication. (UNESCO, 2002) Opines that ICTs are the fundamental building blocks of the present day society. Contemporary society is highly influenced by ICTs in every aspect of life, including education. There are various disciplines where ICT has affected for instance economic, political, and socio-cultural perspectives. ICT has impacted many sectors of the world but in this paper, much emphasis is put on teaching and learning. The effects are experienced more in the field of education since it has the potential for teachers to transform the teaching methodology to meet individual needs. Today, schools are under pressure to adapt to this technological innovation. ICT provides remarkable opportunities for developing countries to enrich their educational system since it can help in acquiring and assimilating knowledge (Byungura et al., 2019)

There are very many areas or factors where ICT has impacted whether positively or negatively; economic, sociocultural, political, and historical perspectives among others.

1.1. Background of this paper

The importance of ICT has been recognized by educational institutions worldwide. (James Mukhula et al., 2021) asserts that ICT has influenced the way people function today, both personally and professionally, which demands change in the educational arena. Schools that train their students in yesterday's skills and outdated technologies are not meeting the needs of tomorrow's world. Such children will not fit into tomorrow's professional requirements. Effective use of ICT is crucial to countries that are progressing towards an information or knowledge-based society. Most of the developed countries managed to reach their stage of development due to advancements in technology, The case in the People's Republic of China (PRC) is the lead in terms of technology, the United States of America, and most of the European countries. The application of information and communication technologies in education has been divided into two main categories: ICTs for Education and ICTs in Education. ICT provides great flexibility in education to ensure that learners can access knowledge anytime and from anywhere. It also affects the way knowledge is imparted and how students learn. The function of ICT is to enable products or goods or services to be produced within a shorter period with all the computerized systems. It improves efficiency in delivering services rapidly. The use of email, e-commerce, and online transactions for banking or any other activities has tremendously reduced the amount of time for transportation, hence, saving money. With the evolution of ICT with the best technology and management practices coupled with proper political issues, and socio-cultural aspects of lives in the community. In recent times, Information and Communication Technology (ICT) has gained significant recognition in various sectors, including education. With the increasing availability and accessibility of ICT tools and resources, its impact on teaching and learning in secondary schools in Uganda has become a topic of interest. This literature review aims to explore the research conducted on the impacts of ICT on teaching and learning in this context. Numerous studies have demonstrated the positive effects of integrating ICT in secondary school classrooms. According to Ayot and Ondigi (2019), ICT integration enhances instructional delivery, engages learners, and facilitates collaboration and active learning. Classroom use of ICT tools such as computers, projectors, and interactive whiteboards has been associated with increased student motivation, participation, and achievement (Twesigye & Rwegasira, 2017).

2. IMPACT OF ICT IN TEACHING AND LEARNING PROCESS.

2.1. Introduction

Technology plays a crucial role in strengthening interpersonal connections (Mchone, 2020). It has contributed in the sectors of health, transportation, electricity, etc. to all the demographic factors of society eg: Modern farming replaced primitive farming allowing increased crops, less time investment, etc. "Information and communication technologies (ICT) represent the fastest and most profound technical change experienced in the region and, indeed, in the world. For example, a robust global pedagogical method has been developed to facilitate the education of large numbers of children. Technology is becoming more and more prevalent in today's education system. Many schools are allocating funds to implement the "one-to-one" initiative. One-to-one initiatives in education (often abbreviated as 1:1) refer to the practice in which educational institutions, issue each of their registered students a computing device, such as a laptop or tablet, for the students to access the Internet, digital course materials, and digital textbooks students to be "1 to 1" with a technology device (Huppert, 2019). Since technology is being utilized within the classroom daily, schools must keep up with the ever-changing technological advances.

2.2. Positive impact of ICT in teaching and learning process in school

In 2019-2022, the world saw first-hand the impact of the pandemic on the rapid transformation of the education system towards more technology-driven, virtual learning experiences. With the pandemic, schools, educators, students, and parents were forced to become more tech-literate at a faster rate than ever before, allowing them to continue learning from the comfort of their own homes. Educators were inundated with new technology tools and activities, programs, and devices that they had to implement into their new "virtual classrooms." During the pandemic, educators were feeling overwhelmed. Not only were they stressed by the sheer number of technology programs to implement, but they were also experiencing physical pain in the form of headaches and eye burn due to the excessive amount of screen time they were having to endure. Once teachers bring the technicalities associated with classroom-related hardware and software resources to the classroom, they can enhance the teaching. This can then be used to create more teaching resources.

2.2.1. Assessment of learners.

The use of information and communication technology (ICT) for assessment can also free up valuable teacher time within the school (Md et al., 2015). These particular technological developments, such as broadband access to the internet, will consider the need to personalize the learning experience within the school. Networking within the school and the entire education sector has been a key factor in embedding ICT. School-designed systems and Excel spreadsheets are the most effective tools. We know that school data was involved in setting up the setting and compiling reports to the parents. For instance, after a teacher completes the students' report on Microsoft Word, they can save and print it out simultaneously. This gives the teacher more time to get the work done for the students.

2.2.2. Record purposes in the schools.

ICT was the key factor in improving the efficiency of the teachers, along with the staff by using software and hardware Teachers also saw the benefits of managing, storing, and other work like preparing reports with time saved (Srivastava, 2016). The Internet has significantly increased the availability of resources to promote and encourage learning and teaching throughout the curriculum and all levels of education. It has also made it possible to bring together a wide range of services such as libraries and careers services in one place.

2.2.3. Access to Educational Resources

Through ICT training, teachers can quickly and easily access online databases and educational websites, as well as digital libraries that contain a large amount of information and resources that can be used in their lessons (Madhukar, 2013). The educational software works for analytical purposes in research works. For instance, SPSS, and Camtasia among others allow teachers to create more varied and engaging lessons that meet the needs of different learning styles and learning abilities of students to Collaborate with other educators. ICT training can help teachers share resources and ideas with other educators, which can improve their teaching practices and enhance the quality of education for students. Access to digital resources through ICT plays a vital role in improving teaching and learning outcomes. Research by Okello-Obura and Mulindwa (2020) reveals that ICT-enabled access to educational content, including online libraries, e-books, and educational websites, enhances students' knowledge base, promotes self-directed learning, and provides teachers with additional teaching materials. Technology can help teachers create more dynamic and engaging lessons that capture students' attention and keep students engaged throughout the entire class. This can help students retain information and improve their academic performance(Gershenfeld et al., 2001)

2.2.4. Improved Communication and Collaboration.

ICT training for teachers can also improve communication and collaboration between teachers and their students. With the use of technology, teachers can easily communicate with their students through email, messaging apps, and online discussion forums(Albantani & Madkur, 2019). This can help to create a more interactive and engaging learning environment, where students can ask questions and receive feedback in real time. Additionally, technology can facilitate collaboration between students, allowing them to work together on projects and assignments, even if they are not in the same physical location. This can help to develop important teamwork and communication skills that are essential for success in the modern workplace.

2.2.5. ICT promotes higher-order skills

One of the key skills for the 21st century includes evaluating, planning, monitoring, and reflecting to name a few(C.N, 2016). The effective use of ICT in education demands skills such as explaining and justifying the use of ICT in producing solutions to problems. Students need to discuss, test, and conjecture the various strategies that they will use. There is an increasing range of software tools that can be used to support the development of higher thinking skills such as application, analysis, and synthesis. Tools can be used to analyze data, present data, link data or information, present information in different formats, simulate environments and conditions, and support interactive communications. This allows teachers to consider providing a range of activities to assist students in becoming critical thinkers, designers, and problem solvers.

2.2.6. Active learning and authentic assessment

ICTs potentially offer increased possibilities for codification of knowledge about teaching and for innovation in teaching activities through being able to deliver learning and cognitive activities anywhere at any time (Md et al., 2015). In many classroom situations, it is difficult to allow students to be sufficiently active as participants. Typically students are often passive, spending a lot of time listening or reading. It is well known that students are more likely to be interested and

attentive and will achieve a wider range of learning outcomes if they can be active. Their engagement with the curriculum will increase as they are afforded opportunities to create their own information and represent their ideas. Expert systems can be used to provide students with learning experiences where they interact directly with the computer system, and are not just passive but active participants in the learning process, thus increasing the quality of education (Alfarsi et al., 2021). Technology makes the students take an active role in learning instead of taking on a passive role of receiving information from the teachers.

2.2.7. Engage students by motivation and challenge

The interactive and multimedia nature of modern computer systems has provided the opportunity for software developers to create increasingly more stimulating features. Computer systems do provide the opportunity to create a wide range of interesting learning experiences as it makes learning, participatory and a social process supporting personal life goals and needs. This is likely to help to maintain student interest and interest a wide range of students (Cradler & Bridgforth, 2002). The interactive and multimedia features within the software can be used to help students grapple with concepts and ideas. ICT also enables e-learning and blended learning approaches, providing remote learning opportunities for students in secondary schools, particularly in rural areas with limited resources. e-learning platforms and blended learning methods, combining face-to-face instruction and online resources, have the potential to improve educational equity, reduce geographical barriers, and enhance students' digital literacy skills.

2.2.8 Provide tools to increase student productivity

In the past students have spent a lot of time doing repetitive, low-level tasks particularly involving writing, drawing, and computation (Assan & Thomas, 2012). While it may be necessary for students to develop these skills at some times on most occasions they are pre-requisite to some higher level tasks. Unnecessary repetition of low-level tasks is inefficient, non-motivational, and may obscure the real purpose of the learning activity. Many computer applications provide the tools to support students in quickly completing these lower-level tasks so that they can focus on the main purpose of the activity. Word processors, graphics packages, database packages, spreadsheets, and other software support the performance of students. ICT has transformed teaching and learning processes from being highly teacher-dominated to student-centered, and this transformation will result in increased learning gains for students, creating and allowing for opportunities for learners to develop their creativity, problem-solving abilities, informational reasoning skills, communication skills, and other higher-order thinking skills (Nwigbo & Madhu, 2016). The effective integration of ICT in teaching and learning requires adequately trained teachers. Various studies highlight the importance of teacher training and professional development programs to enhance their ICT skills and pedagogical practices (Namisango & Kizito, 2016). Continuous training programs, workshops, and mentoring can help teachers adapt to new technologies and develop innovative teaching strategies.

2.2.9 Overcome physical disabilities

The variety of input and output devices available provides the opportunity for students who are physically handicapped to be involved in the same learning activities as other students (Srivastava, 2016). For some students computers provide the only environment which they can manipulate and the only tools that reduce their level of disability. Modified keyboards and mouse drivers may be used to allow extremely handicapped students to use regular software packages. For students who are not able to take notes during the class, the system stores in database lessons already taken for further studies and provides a more user-friendly environment for blind students through audio interpretation of the course (Bingimlas, 2009), thus enhancing their learning.

2.2.10 Management of learning experiences

The management of high-quality educational programs requires and generates large quantities and types of data (James Mukhula et al., 2021). Teachers face many management problems which when analyzed could be suitable for a computer solution. Many such tasks may be both time-consuming and tedious for which teachers should consider a computer solution. Such tasks may include the organization of assessments, the maintenance of library functions, the preparation of reports, and the organization of events. Many school management packages will complete tasks such as these and thereby free up a substantial amount of time for other more important tasks. Schools should make use of the opportunity to continually provide more appropriate solutions to the dynamic problems associated with the provision of schooling (Altun & Khurshid, 2021).

2.3. Negative impact of ICT and IT in teaching and learning (Education)

Technology can be a transformational learning tool for students if it is implemented in the classroom correctly. It can also become a teacher's worst nightmare and hurt student learning

2.3.1 Laziness among students.

Students, however, feel too lazy to attend class if they can easily get the study material from the web. Let's say the lecturer gives an assignment to the students, they may not understand if they never attend that class (Z. Mahmoodi et al., 2023). The technological reliability was important and yet the students could respond negatively to a resource, both of teaching and technology. Across schools or colleges, students might not value ICT because they spend too much time on presentation needs and copying without reading and understanding. At the same time, students will search the information from the web and be caught by "cutting and pasting". Through this type of behavior, the reliability of the students will be affected. By then the students will access the internet for other things, for example, Facebook, MSN, Yahoo, Twitter, and others. While the lecturer has the lesson in front, they will not pay more attention to the lecturer.

Furthermore, the students sitting in front of the computer for a long time may cause health problems. Health problems such as stress and eye strain can affect a student in their education. By then ICT may also create some illegal acts such as pornography. Those students who are affected by pornography may suffer in their studies. The students will waste time using ICT rather than studying their work.

2.3.2 Student Mental Health

The amount of screen time students are experiencing per day has a direct correlation to their emotions, behaviors, and mental health (Strom, 2021). During the COVID-19 pandemic, students were required to spend the majority of their day in front of screens which negatively impacted social interactions and time that may have been dedicated to sports or other extracurricular activities. Of the 1500 mothers surveyed, a majority (60.2%) observed behavioral changes in their children. The most frequently observed symptoms were restlessness (69.1%) aggressiveness (33.3%), and anxiety (34.2%) (Scarpellini, et al., 2021). Children need social interaction to maintain a sense of normalcy.

A study conducted by (H. Mahmoodi et al., 2018) in Iran was used to investigate the association between screened device overuse and mental health, among high school students. The researchers used a three-section questionnaire for over 1,000 students to determine the correlation between technology addiction, general health, and their sociodemographic information. The results showed that overuse of technology was in fact, associated with poor mental health. Overuse may cause withdrawal, resulting in feelings of anger, tension, and/or depression when the technology is inaccessible. Overuse may cause tolerance, resulting in the need for more technology, more software, or more hours of use. Using technology excessively can increase the likeliness of lying, arguments, poor achievement, social isolation, and fatigue.

According to a study conducted by (Montenegro-rueda, 2021), the use of new technologies can be negative for teachers because it implies changes in their teaching methods or pressure to acquire technological skills, leaving sequelae such as physical, social, and psychological problems. The lack of support and training provided by school districts and the pressure to implement new technologies is counterintuitive. For educators to alleviate this stress and anxiety, the school districts need to determine which technologies are necessary for student learning and provide them with the professional development courses needed to master them.

2.3.3 Technical Challenges

The effectiveness of ICT tools in teaching is affected by technical challenges such as inconsistent internet connectivity and the lack of infrastructure. The reliability of the technology used, the maintenance of software and hardware, and access to technical and user support also pose a challenge.

2.3.4 Integration of Technology with Traditional Teaching Methods

The integration of technology in teaching requires a transitional period that might cause resistance to change from both teachers and learners. The use of technology may require a shift from traditional teaching methods, and this can be a difficult process, especially if the teaching staff is not well-versed in the use of technology.

3. CONCLUSION AND RECOMMENDATION

ICTs have had a positive impact on educational practices and will continue to have a positive impact in the future. ICTs will transform several educational practices and will have a strong impact on the teaching-learning process, the accessibility of education, the motivation of learners, the congenial learning environment, and the academic performance of students. Technology has a big impact on the delivery of lessons or even education. It also increases flexibility, so that students can access learning regardless of time and geographical constraints. It also creates a rich learning environment, which provides new opportunities for teachers and students. Such opportunities can have a major impact on students' academic performance and educational attainment. Similarly, the wider availability of good education practices and educational programs that can be disseminated through ICT will help to spread the best education system. Parents need to be aware of the amount of time their students are spending on their devices and set clear boundaries. Creating time to spend as a family doing physical activities is a great way to reduce screen time and increase physical health outcomes.

These recommendations provide students and educators with some guidance as to how they can mentally and physically feel better about implementing technology into their classrooms and personal lives. Being knowledgeable of the negative effects that technology can have on mental health, physical health, and student learning, is the first step towards developing healthy and intentional technology use habits. It would provide a rich environment and motivation for the teaching-learning process which seems to have a profound impact on the process of learning in education by offering new possibilities for learners and teachers. Similarly, the wider availability of best practices and best course material in education, which can be shared using ICT, can foster better teaching and learning.

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