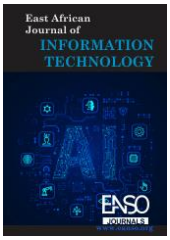

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Original Article

Practical Application and Management of Information Communication Technology (ICT) to Enhance the Performance of Ugandan Secondary Schools in West Nile

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ICT, Academic Performance, Digital Literacy, Education Outcomes, Teaching and Learning, West Nile Region, Student Engagement.

ABSTRACT

This study focuses on the contribution that Information and Communication Technology (ICT) can make to improving teacher and student performance in secondary schools in West Nile Region, Uganda. Examines the existing ICT implementation, assesses integration and potential benefits issues, and analyses the relationship between ICT usage and learning outcomes. The research is focused on showing that ICT can go global and how it connects Uganda's secondary schools in West Nile to global education networks. ICT enhances global learning through active participation, innovation, and flexibility through access to international resources and embracing cross-boundary collaboration and virtual interchanges. This has improved student achievement but also endows students and teachers with the competencies to prosper in a globally connected environment. Ugandan schools have poorly developed ICT facilities, but schools embrace ICT education and facilities for operations. The study centers on specific ICT issues in West Nile schools and explores the possibility of using ICT to raise aggregate performance and efficiency in communication, collaboration, and organizational management. Quantitative and qualitative data were collected from 400 respondents, including teachers and students from 10 secondary schools. Data collection tools included questionnaires and interviews. Quantitative analysis was performed using SPSS, while NVivo was used for qualitative analysis. Ethical considerations were strictly adhered to protect participants' rights. While observing ICT integration in teaching across the ten selected secondary schools in West Nile and surveying 100 teachers, researchers found that 55.6% of them sometimes, 33.3% consistently, and 11% seldom integrate ICT in their teaching. This limited integration is due to a lack of ICT equipment, for example, computers, projectors, and internet connections; inadequate teacher education, where the majority of the teachers are found to be either lacking skills or self-confidence to incorporate ICT in teaching; and limited resource availability where even schools that have procured ICT tools are most often found to be having very few that are inadequacy for the needs of both teacher and students to make effective use of. These results raise concerns regarding the existing disparities in developments and funds for ICT training in West

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Nile's secondary schools, with recommendations being made to enhance specific plans to reduce the digital divide. These include making ICT tools a focal area, increasing internet connection, and providing training activities that would increase and develop the competencies of the teaching staff. They seek to devise a technological learning atmosphere to enhance education, teacher, and student learning outcomes.

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INTRODUCTION

The adoption of ICT in educational systems is acknowledged worldwide as a vehicle for enhancing the quality and delivery of education (Habibu and Md. Abdullah-Al-Mamun, 2020). The use of ICT is globally identified as a relevant tool that can potentially improve education systems (Kozma, 2005). ICT in secondary schools can improve students' perceptions, introduce new systematic approaches to the learning-teaching process, improve the school's administrative work, enhance teaching-learning resources, access to information, and effective communication among education stakeholders (Clement, 2012). More importantly, the success of ICT integration depends on how it is implemented and administrated in schools. Several schools in Uganda, particularly in the West Nile region, have graced the use of ICT in secondary schools to find a solution for poor performance and inequality in education. However, factors arising from this setting must be addressed to realize the full potential of ICT (Andryukhina et al., 2020). The ICT challenges observed in the West Nile region of Uganda secondary schools can be considered typical, in a general sense, of unequal ICT distribution in the East African region, though compounded by factors such as geographical isolation, lack of physical infrastructure, and erratic power supply. As observed in other regions in East Africa, costs of acquiring ICT equipment remain high in the schools of the West Nile region; most teachers have not received adequate training in the use of ICTs, and there is limited affordability of internet connection. However, these challenges are compounded by West Nile sitting directly adjacent to refugee-bearing countries, exerting pressure on local resources and the general reliance on donor-based ICT projects, usually short-lived projects. However, in urban areas of Uganda and other countries like Kenya or Rwanda, ICT uptake is higher because of better physical infrastructures, government-disposed investor resources, and Public-Private Partnerships (PPPs). This comparison underscores the need to develop West Nile ICT interventions that can work around the existing challenges and from successful implementations in more developed regions of East Africa.

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Currently, the Ugandan government has recognized the importance of ICT in realizing the sector's objectives and promoting literacy rates, as evidenced in the indicated policy frameworks (Asare et al., 2023). The National Information and Communication Technology Policy provides directions on how best to support ICT integration in our schools since the policy recognizes that the integration of ICT in the country's schooling system is critical in the country's total development and the realization of the broader Visions 2040 (Ministry of Information and Communications Technology [MoICT], 2014). However, there is this commitment towards improving and implementing ICT in Ugandan secondary schools, particularly in the West Nile region of the country; there are challenges. Lack of proper ICT gadgets, low training, low technical support, and irregular internet are some barriers to the application of technology-enhanced learning. The socio-economic constraints coupled with the operation in a regional setting limit West Nile's access to essential ICT resources, thus causing a digital rift between urban and rural regions.

The West Nile region has many challenges to education delivery, such as a young and growing population, inadequate school facilities and equipment, high student enrollment ratios to teachers, and deficient teacher training. Under these conditions, there is a central imperative to have a proper and substantial ICT system; it might help to overcome a lack of qualified teachers, simplify administrative work, and provide individual learning approaches for students with different learning difficulties (Naik et al., 2020). ICT adoption and functionality in this region might enhance education delivery, quality teaching and training, and institution standards. However, for ICT to have a positive impact, one must define its functionality based on implemented strategic actions aimed at fixing inadequate infrastructure and meeting the demands of the given country (Rind et al., 2022).

This research focuses on analyses of the successful implementation and administration of ICT within West Nile secondary schools to enhance teacher and learner performance. In terms of practical implications, this study offers suggestions for ICT integration challenges and potential for improvement through an evaluation of the present state of ICT (Kibirige, 2023). Quantitative and Qualitative data is collected for the purpose and cleared with the primary respondents, i.e., teachers, students, and administrators, for understanding the effectiveness of ICT in educational performance (Dikmen & Demirer, 2022). The findings of this study seek to inform the formation of policy to prescribe the implementation of ICT in education, to support ICT expenditure, and to provide specific best practices to enhance ICT education.

In analyzing these dimensions, this research adds knowledge to a work that addresses ICT in education and learning in developing contexts. The study provides valuable information on how education in Uganda, specifically in areas such as West Nile, can use ICT to enhance education and drive innovation, among other benefits (Su & Chen, 2024).

Lastly, this study finds a need to ensure proper strategies for implementing and managing ICT in addressing the challenges they face in their region, improving the quality of education they offer, and preparing their students for the globally connected digital environment. This research aims to investigate the potential of ICT and propose strategies to improve the academic performance of Ugandan secondary schools in the West Nile region. The challenges and opportunities related to ICT integration in the teaching and learning process, its use, and its link with student accomplishment are identified by assessing the existing status of ICT infrastructure. This study seeks to suggest ways to optimize ICT's influence on educational processes and Outcomes in a specific context (Aheisibwe & Barigye, 2023)

BACKGROUND OF THE STUDY

The use of ICT in education has been recognized worldwide as a technique for improving educational outcomes (Ghanizadeh & Yazdi, 2023). According to research, ICT can boost

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student engagement, enable novel teaching approaches, and encourage personalized learning experiences Bushati et al., (2012). However, effective ICT implementation in schools necessitates strategic planning, sufficient resources, and ongoing support for instructors (Washington, 2015).

In Uganda, the use of ICT in secondary school has been a primary focal point for addressing the issues of limited educational resources and improving learning outcomes (Bakesha et al., 2021). Despite infrastructural problems such as irregular power supply and restricted internet connection, Ugandan schools have steadily used ICT for administrative and educational purposes (Ndejjo et al., 2023). This connection intends to reduce administrative procedures, enhance data management, and enable efficient communication between schools and academic authorities (Ouma, 2021).

In the West Nile region, Ugandan secondary schools face unique challenges and opportunities regarding ICT implementation Ministry of Information and Communications Technology [MoICT], (2014). These schools are crucial in driving educational advancement in the region, where there is a need to improve academic quality and accessibility National Planning Authority, (2020). The application of ICT in these schools is intended to:

- Improve educational Performance in Ugandan Schools: Schools use digital tools and resources to deliver more exciting and practical learning experiences. ICT can assist a wide range of learning requirements while providing access to many information and educational resources.
- Improve efficiency in administration: ICT enables improved management of school operations, such as student records, exams, and financials. This efficiency can result in more informed decision-making and resource allocation.
- Enhancement of communication and Collaboration: Effective communication within the school and with internal and external stakeholders, such as sponsors, parents, and educational authorities, is crucial for building a collaborative academic environment.
- Address numerous regional ICT problems: Most schools in the West Nile region confront unique issues, including limited resources and infrastructure. ICT deployment in these schools aims to overcome these hurdles by using technology to improve education.

The research provides significant practical insights and recommendations for enhancing ICT use and administration in secondary schools across West Nile.

LITERATURE REVIEW

The practical application and management of ICT in educational institutions, specifically Ugandan secondary schools in the West Nile Region, is crucial for enhancing performance and overall quality of education. Several studies have highlighted the importance of integrating ICT into educational settings to improve teaching and learning outcomes (Alemu, 2015).

In a study conducted in Uganda, Willis Towers Watson examined the effectiveness of school practice in improving student teachers' pedagogical practices in West Nile (2021). The findings of this study emphasized the significance of practical training and experience in enhancing teaching skills and ultimately improving the quality of education in the region. This suggests that incorporating ICT tools and resources in teacher training programs could further enhance educators' pedagogical practices in Ugandan secondary schools.

Furthermore, promoting digital literacy in African education has been identified as a critical factor in improving the quality of teaching and learning Strawbridge et al., (2022). Schools can enhance their performance in national examinations and overall academic achievement by equipping students and teachers with the necessary digital skills. Integrating ICT innovations in the

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curriculum of Ugandan secondary schools in the West Nile Region could lead to a more technologically advanced and effective learning environment.

Teacher management is another critical aspect that influences the performance of educational institutions. A study on teacher management in refugee settings in Uganda highlighted the importance of improving teachers' effectiveness in secondary schools Mendenhall et al., (2018). By applying a mixed-methods approach, strategies can be developed to support and enhance the skills of educators in Ugandan secondary schools, ultimately leading to improved academic performance and student outcomes. Additionally, the strategic plan for the West Nile Region in Uganda aims to support and initiate programs that promote quality formal and informal education (Garzon & Inga, 2023). By incorporating ICT initiatives and resources into the educational programs of Ugandan secondary schools, the region can work towards achieving its mission of enhancing the overall quality of education.

ICT infrastructure in Uganda, especially in the West Nile region, has been discussed repeatedly. They note that schools' access to technology tools, including computers, Internet connection, and power supply, is severely constrained, thus limiting the effective implementation of ICT. Chomunorwa et al. (2023) agree with (Sadiq et al., 2022) that the minority of secondary schools in West Nile have access to essential ICT tools, and most of them do not have functional computer laboratories, let alone internet connectivity. Consequently, the use of ICT has become less frequent and irregular with educational processes. This is supported by (Sadiq et al., 2022), who reinforce this by asserting that many parts of the country's rural Center have been left marginalized through efforts such as the Rural Communications Development Fund (RCDF). This has led to a significant gap in the provision of resources between developed and less developed area schools and thus has greatly influenced the performance and quality of education in regions such as West Nile.

Expert use of ICT is directly correlated with the capability of teachers to incorporate technology into the learning process. Research shows a glaring gap in Experiences and Professional Development (ICT training) for teachers in West Nile schools. According to Umar et al. (2023), however, established that while there is a growing effort with schools and faculties offering rudimentary ICT skills that may help teachers put in place essential pedagogy knowledge in incorporating knowledge in the use of technology, most teachers remain in the beginner or intermediate category, and therefore are not ready to integrate the use of technology in their instructional work. This is an excellent challenge because ICT tools need recourse and skilled deployment to enhance education performance. A survey showed that sixty-five percent of the teachers in the West Nile region use ICT tools primarily for lesson planning and literature search but not for teaching purposes. The study underpins the need to design advocates or specialized faculty development programs that address pedagogy in the use of ICT in learning and teaching 'not just facts (Umar et al., 2024).

Studies have also revealed how ICT can transform student engagement and learning achievements by creating individual interactive teaching and learning models. Hosni et al. (2020) found that frequently implementing ICT raised learner participation by about fifteen percent in specific classes involving the use of technology in subjects such as sciences, whereby the application of technologies enabled the use of simulations and interactive practices as practical teaching-learning tools. Hosni et al. (2020) also supported engaging the classroom with ICT to address students' learning needs. West Nile schools prove their observation by identifying that students who apply ICT tools in their assignments and research activities improve critical thinking and problem-solving skills. However, the study also mentioned that due to the unavailability of computers and reliable internet connections, students often could

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not access these technologies (Alenezi et al., 2023).

There has been growing concern about factors inhibiting the use of ICT in teaching and learning in West Nile schools, and the following has been noted. Ávila-Meléndez (2024) pointed out some constraints, including lack of funds, poor technical support on information and communication technology, erratic power supply, and poor internet connectivity, as barriers to implementing ICTs in rural schools. These infrastructural deprivations deny schools the potential to exploit ICT tools despite government policies to embrace Information Communication Technology. (Rana et al., 2020) observed that culture as it relates to technology, especially in rural environments, is an issue of concern. In many communities, for example, there is low awareness of the use of ICT in education, which results in negative attitudes by teachers and parents (Mapisa & Makena, 2024). This cultural barrier is a significant setback in implementing ICT, especially in areas like West Nile, where the traditional teaching mode is prevalent (Teoh et al., 2022).

Through several development policies, the Ugandan government has tried to enhance ICT development in schools. The National ICT Policy that was revised in 2021 and the National Development Plan III 2020/25 also underscore the increased embrace of ICT in education to address the learning achievement gap and the urban/rural divide National Planning Authority, (2020). (Aziz, 2020) pointed out that as much as these policies have provided frameworks for integrating ICTs, their enactment is still gradual, particularly in neglected areas such as the West Nile Region. In this report, the author highlights an imbalance of funds required in the government sector to improve ICT equipment in schools, especially in rural areas. It also emphasizes the need to set structures, guidelines, and policies to guarantee the continued rise of ICT infrastructure (Juška, 2020).

Based on the analysis of the literature, several recommendations have been made to enhance the practical application and management of ICT in Ugandan secondary schools, including (1) Strengthening ICT Infrastructure - Similarity highlighted the need to provide adequate funds to embrace and equip schools with facilities such as internet connectivity, computers and closing the power gap through availability of sources like solar power; (2) Enhancing Teacher Training - According to (Mpirirwe et al., 2021), teachers require ongoing CPD programs that emphasize the use of ICT in curriculum delivery. This entails educating the teachers on not only the integration of the technology but also the use of the technology in enhancing teaching strategies; (3) Promoting Public-Private Partnerships (PPPs) - According to Wambi et al. (2023), there is a need for more funding from the government, the private sector, and NGOs to support ICT successful implementation projects in rural schools. They could complement funding gaps and bring resources to places of otherwise probable scarcity in the clusters of private and state education institutions; (4) Tailoring ICT Solutions to Local Needs: (Olema et al., 2021) also stress contextually proper ICT solutions, focusing on the experiences developed by schools in rural areas such as West Nile; (5)This also involves providing ICT tools for low cost, low bandwidth, preferably relevant for areas with restricted internet access; and (6) Creating ICT Policies for Schools: Mungure et al, (2021) opine that schools should also establish individual ICT policies to facilitate the proper use of ICT in learning. These policies should include students' ICT usage, tutors' roles, and general ICT in the learning institution policies.

This strategic approach aligns to leverage technology to improve teaching and learning practices in educational institutions Pera et al., (2022). In summary, the practical application and management of ICT in Ugandan secondary schools in the West Nile Region can significantly enhance performance and academic outcomes (Joshi et al., (2021). By integrating digital literacy initiatives, improving teacher management strategies, and aligning with strategic plans for educational development, schools in the region

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can create a more technologically advanced and effective learning environment Wu et al., (2022). This, in turn, can lead to improved student achievement and overall quality of education in the West Nile Region of Uganda.

MATERIALS AND METHODS

This study section details the Research Design, Population and sampling, Data collection methods, data analysis, and ethical considerations.

Research Design and Population and Sampling

This study employs a mixed methods approach to understand the impact of ICT in enhancing school performance. The study, exploratory, and evaluative dimensions are combined in a mixed-methods design. The exploratory component includes interviews with the teachers and students to assess ICT's problems, possibilities, and current uses. This is useful in realizing the background and the ICT use in West Nile secondary schools. The evaluative aspect helps to evaluate current applications of ICT and compare their usage with achievements as gathered from research questionnaires and school achievement records. Both serve to give an all-round view of the state of ICT implementation in the secondary schools of the West Nile region and the possibilities of the same being enhanced, aiming to identify current practices and assess their effectiveness. The target population comprises teachers and students from Ugandan secondary schools in the West Nile region. A stratified random selection approach was utilized to choose 10 West Nile secondary schools, resulting in 400 students and teachers, with five students selected from each class. The students were from 10, ranging from senior one to senior six, for 30 students in each school. Of the 10 West Nile secondary schools with 300 students, 25 female and male students were picked from senior one to senior six, making a total of 150 male and female students. The researchers also chose 10 teachers from each of the 10 schools, for a total of 100 teachers.

Data Collection, Analysis, and Ethical Considerations

Data were collected using a combination of questionnaires and interviews. Questionnaires were distributed to teachers and students, while interviews were conducted with teachers. The questionnaires and interview guide for teachers comprised teacher background, ICT resources and infrastructure, ICT integration in teaching, and professional development. The student questionnaire sections include access to ICT, ICT integration in learning, ICT skills development, and others. The questionnaires were personally administered to 100 teachers from 10 selected secondary schools in the West Nile region. The instruments were pre-tested for validity and reliability, resulting in necessary adjustments to the survey questions for clarity Lochmiller, (2021). The study carried out with the participants indicated the following problems. Some of the questions developed were confusing and were revised slightly to make them more transparent and more appropriate considering the identified study objectives. Further, it was necessary to rephrase some of the questions so that they were apparent not just to teachers with high levels of ICT literacy but also to those with low levels of ICT training. Minor adjustments to the appearance of the survey were also made to make the survey as easy as possible for the respondents to fill in. These changes were made to enhance the quality of the data collected in the study. Quantitative data from the questionnaires were analyzed using SPSS to perform inferential and descriptive statistics Smith, (2003). Qualitative data from interviews were analyzed and transcribed using thematic analysis in NVivo, identifying critical themes related to ICT use and management (Braun & Clarke, 2022). In NVivo, coding for the case study on ICT integration in West Nile's secondary schools combined theory-driven and data-driven strategies. First, practical codes were developed from the theoretical concepts of the study, like ICT infrastructure, teachers' training, and resources. Finally, as the collected data were analyzed, new inductive codes appeared, reflecting the aspects that had not been

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initially considered. To maintain inter-observer reliability, one of the following days, the procedure was repeated with the second coder and the level of inter-observer reliability was compared. Discussions were made periodically to sort out all the differences, including the application of codes to make the study more credible. Explicit informed consent was obtained from all participants, students, and teachers, and to ensure confidentiality, data were collected anonymously (Resnik, 2015).

RESULTS

The study was conducted in 10 West Nile secondary schools in the West Nile region, with a sample of 10 teachers per school in 10 different schools and 30 students from each school in 10 schools, with at least five students per class from senior one to senior six. This has provided insightful findings on ICT's practical utility and control in identifying the gaps. Below are the key findings:

Figure 1: Showing the statistics of the students in West Nile schools

West Nile Secondary Schools					
Sno	Classes	Students per Class per school	Male Students	Female Student	Student per school, in 10 schools
1	Senior One	5	25	25	50
2	Senior Two	5	25	25	50
3	Senior Three	5	25	25	50
4	Senior Four	5	25	25	50
5	Senior Five	5	25	25	50
6	Senior Six	5	25	25	50
	Totals	**30**	**150**	**150**	**300**

Figure 2: Showing the statistics of the teachers in West Nile Schools

West Nile Secondary Schools Teachers		
Sno	Schools	Teachers in each school
1	Schoo1	10
2	Schoo2	10
3	Schoo3	10
4	Schoo4	10
5	Schoo5	10
6	Schoo6	10
7	Schoo7	10
8	Schoo8	10
9	Schoo9	10
10	Schoo10	10
	Totals	**100**

ICT infrastructure and accessibility

It was discovered that 55.6% of the respondents said that the ICT infrastructure is in a fair state, 22.2% said it is poor, and 11.1% responded that it is very poor. Only 11.1% of the respondents acknowledged that it is good, and none of the

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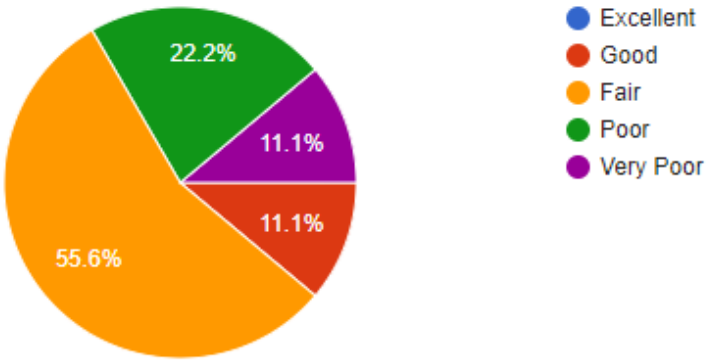
schools that responded have shown up with complete ICT infrastructure for all the schools. This can be attributed to (1) Limited Funding and Resources - Inadequate finances constrain most institutions in the region to invest in quality information communications technology amenities such as computers, servers, and internet connection; (2) Inadequate Internet Connectivity - There is limited access to technology or poor quality internet in many counties, especially in the rural ones including the West Nile region, which limits the use of equipment in lessons; and (3) Lack of Skilled Personnel - Survey of Asian teachers revealed that However, there was a chronic problem of not enough personnel qualified in the Information and Communication Technology (ICT) extension and limited supply of qualified ICT expertise to oversee and effectively deploy the current ICT structures. However, only 11.1% of the schools had ok sources to satisfy the wishes of all students somehow in terms of ICT Infrastructures, Computer Labs among Others.

Figure 3: Showing the state of ICT Infrastructures in Schools



ICT teacher competency

Approximately 44.4% of teachers have intermediate, 33.3% have advanced, 11.1% are experts, and 11.1% are beginners, meaning about 55.5% (Beginners and intermediate) of the teachers do not have competencies in using ICT tools like computers, projectors, education software among others in Ugandan West Nile secondary school. The teacher competency can be due to (1) Limited ICT Training - Teachers still require courses in ICT, as a significant number of teachers in the region have no formal and advanced teaching qualification in the use of ICT in teaching practices; (2) Basic to Intermediate Skills - The study revealed that most teachers in West Nile have minimal or moderate computer literacy skills majoring in the Word processing, E-mailing, or limited internet browsing skills. Specialized competencies such as producing digital content writing skills, analyzing data, or using instructional software are rare; (3) Inadequate Professional Development: There are limited chances to upgrade one's profession in ICT continuously. Some of them lack opportunities for professional development activities, which can enhance their professional skills and introduce them to the newest technologies; and (4) Limited Access to ICT Tools - Professional development topics show that teachers have poor opportunities to practice and develop ICT literacy within schools due to the lack of computers, the internet, among others. Analyzing of teacher competency in ICT use in Ugandan West Nile secondary schools reveals trends of generally poor performance by teachers as shown in the Figure 4 below

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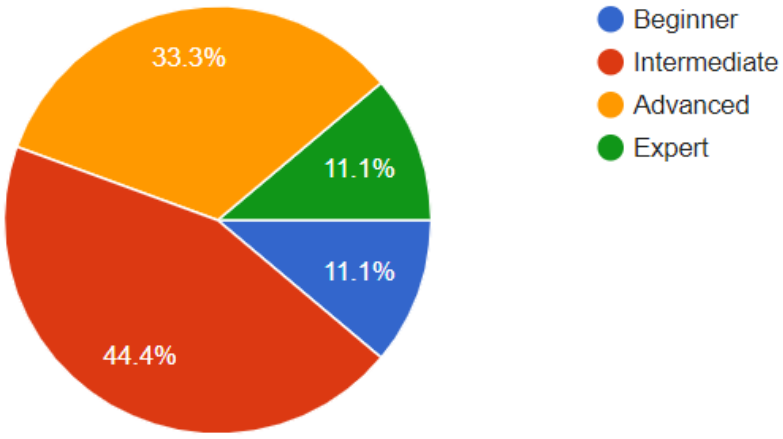
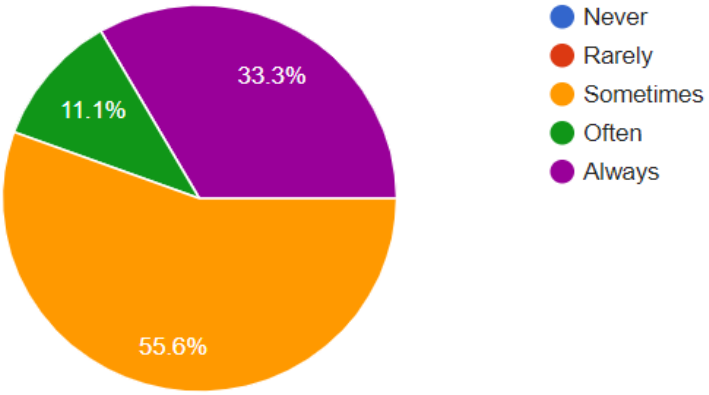
Figure 4: Shows the teacher's competencies in ICT tools



Integration of ICT in teaching and learning

Quantitative analysis shows that 55.6% of the teachers sometimes, 33.3% consistently, and 11% do often integrate ICT in their teaching according to the quantitative data collected from ten (10) Uganda secondary schools and each school we collected from ten (10) teachers a total of hundred (100) teachers across the entire West Nile Region. This is caused by (1) Inadequate ICT Infrastructure -Several schools within the West Nile sub-region demonstrated inadequate facilities, including computers, projectors, and an adequate internet connection to support the use of ICT in classroom lessons. These are essential tools that, without them, teachers struggle to apply technology in the lesson; (2) Insufficient Teacher Training - A significant challenge is the inadequacy of academic preparation implementing Information and Communication Technology (ICT) in the teaching and learning process of tertiary institutions: issues and challenges. ICT competency, in particular the available literature, shows that many teachers in the region lack the competency and confidence to apply ICT appropriately in instruction. Hence, there will be a poor utilization of resources if they are available; and (3) Limited Access to Resources - This is evidenced by the fact that even in some schools that do have some resources in ICT, the number is often inadequate. For example, a small number of computers implies that the students never get a chance to use the computers often, thus limiting the chances of the teacher to incorporate this technology in their lessons.

Figure 5: Shows how is ICT is integrated into teaching and Learning



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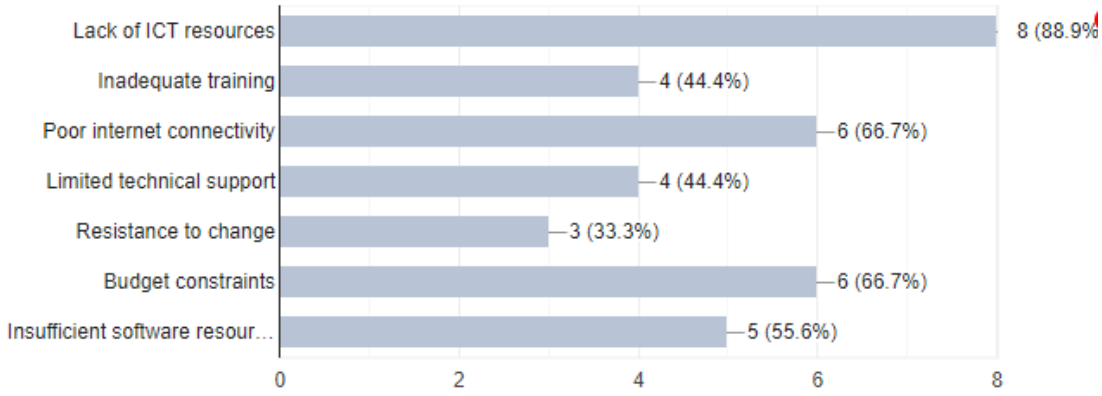
ICT Training and Challenges

Based on the research, most of the ICT training received by different schoolteachers is mainly used as self-study materials. The study indicates that 66.7% of the teachers read independently in ICT to train themselves on different topics, and 33.3% is covered under Online tutorials and webinars, peer training and collaboration, and Formal workshops and courses. The study indicates that teachers face several challenges when using ICT in teaching, which include a Lack of ICT resources standing at 88.9%, Inadequate training at 44.4%, limited technical support at 44.4%, poor internet connectivity at 66.7%, Resistance to change at 33.3%, insufficient software resource at 55.6%. Such factors are found in inference from the gathered data and can be regarded as trends that impact the application of ICT in education as illustrated in Figure 6 below

Figure 6: Challenges faced when using ICT in your teaching

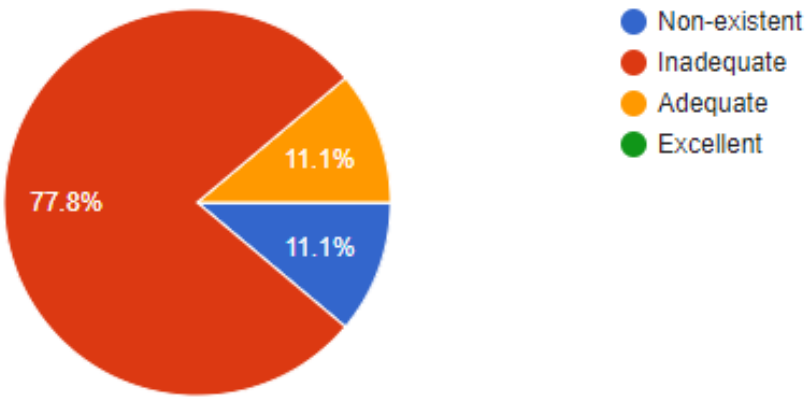


Technical Support in Ugandan Secondary Schools in West Nile

Continuously monitoring the level of technical support that has been available in solving the ICT issues in these Ugandan secondary schools shows that 77.8%, Adequate at 11.1%, Non-existent at 11.1%, and excellent was not voted but voted by the respondents indicating that there is little or no technical support offered to the teachers at school.

According to the pre-specified inferential analysis, a lack of, or insufficient, technical support was identified as a significant obstacle to teacher use of ICT for educational ends. This trend further calls for increased efforts to enhance the technical support infrastructure in Ugandan secondary schools. This is shown in Figure 7 below

Figure 7: Showing the level of technical support



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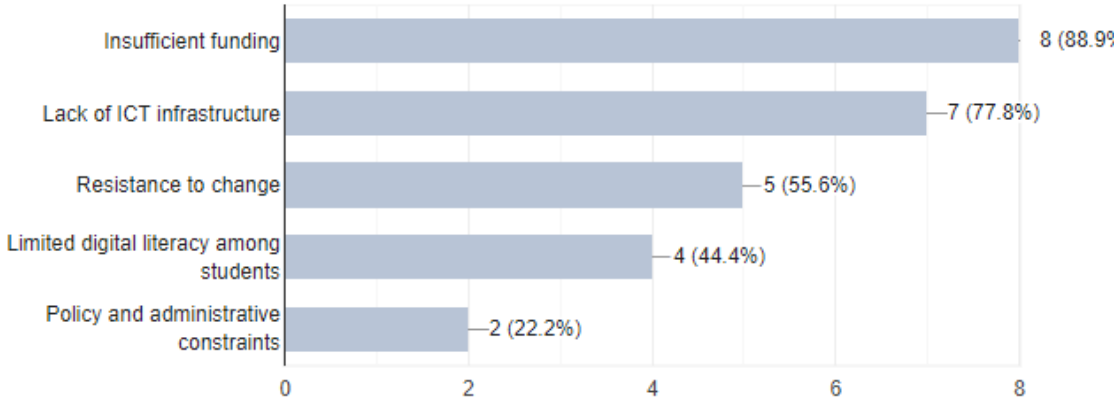
Barriers to ICT adoption

Many different barriers play a very negative role in implementing ICT effectively in the Ugandan West Nile Schools, where insufficient funding stands at 88.9%, rated highest, lack of ICT infrastructure at 77.8%, resistance to change at 55.6%, limited digital literacy among students at 44.4% and policy and administrative constraints at 22.2%. High levels of administrative support and funding for ICTs are indicators of increased adoption of the technology in schools. Moreover, schools that tried to overcome generations' reluctance towards technology using peer training and cooperation improved the situation with teachers and ICT usage in classrooms significance.

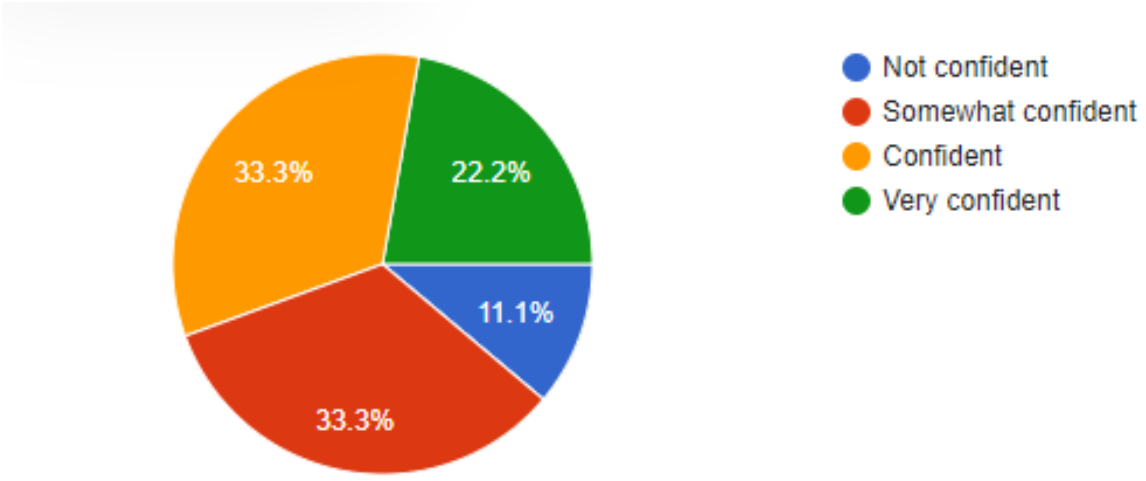
Figure 8: Showing Barriers that prevent the use of ICT in schools



Teacher training and curriculum integration

We also discovered that only 22.2% of the schools could integrate ICT into the curriculum, while the rest of the teachers struggle with ICT curriculum in their teaching and learning; 11.1% completely don't know anything about curriculum integration, which is a huge problem, especially when you are implementing the new curriculum, which requires the curriculum integration to be done at its best. The inferential analysis relates increased teacher competency with more frequent use of ICT and so improved training as a potential for better integration of ICT in the curriculum. This is well illustrated in Figure 9 below

Figure 9: Shows the statistics of Curriculum Integration in the West Nile region



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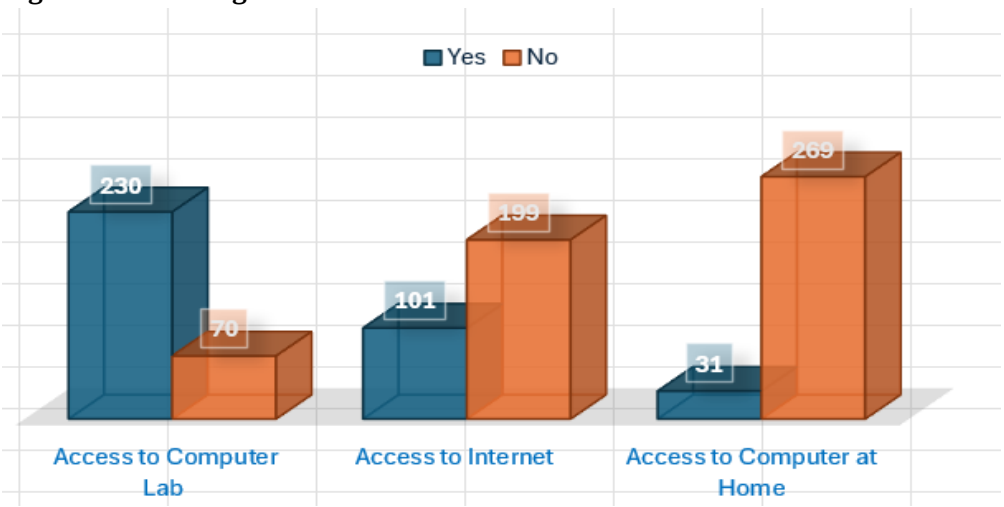
Students Access to ICT Services

The study was conducted on the respondents, students from ten (10) schools. In each school, 30 students responded to the questions. Five (5) students from each class, i.e., senior one to senior six, each picked five (5) students. We discovered that under access to the ICT services within these selected schools, of the 300 respondents, 230 students have access to the computer Lab at school, representing 76.7%, whereas 70 students have no access to the computer Lab, representing 23.3% of the students in these Uganda 10 schools in West Nile. Also, we found out that only 199(66.3%) of the students do not have access to the Internet while at school, and 101 (33.7%) of the students have access to the Internet at school. Most students do not have access to computers or ICT equipment at home. Only 31(10.3%) of the students have access to computers at home, and 269(89.7%) have no access to ICT equipment while at home. This implies there is a significant digital divide, about ICT usage in school as well as at home, which may affect students' interest in learning using digital media. This is illustrated in Figure 10 below.

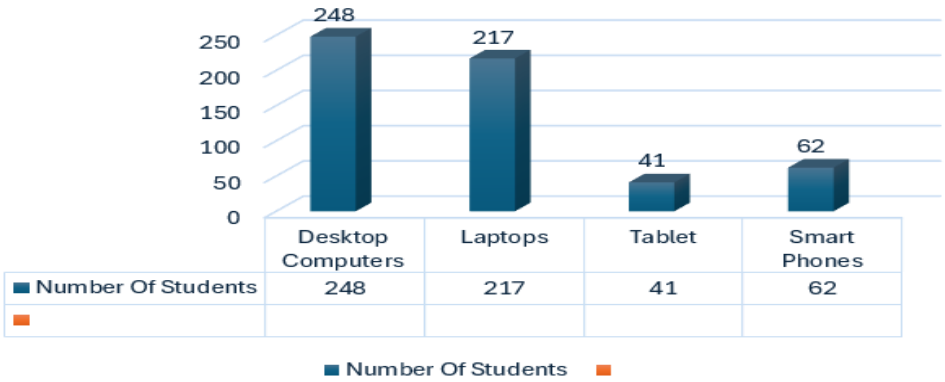
Figure 10: Showing students access to ICT services



Trends in ICT Tools and accessibility

Similarly, students in these schools use mostly desktop computers, which account for 82.6% of the total, laptops at 82.3%, tablets at 13.7%, and smartphones at 20.7%. This implies that West Nile Schools use desktop computers and laptops more than tablets and smartphones in the West Nile Region. From this trend we learn that Computer Labs investments could most likely yield the best return on investment in desktop-based computer labs to start with; mobile-friendly solutions could help to address gaps as and when they emerge in the future. Consider Figure 9

Figure 11: Shows the type of ICT devices Used in West Nile Schools.



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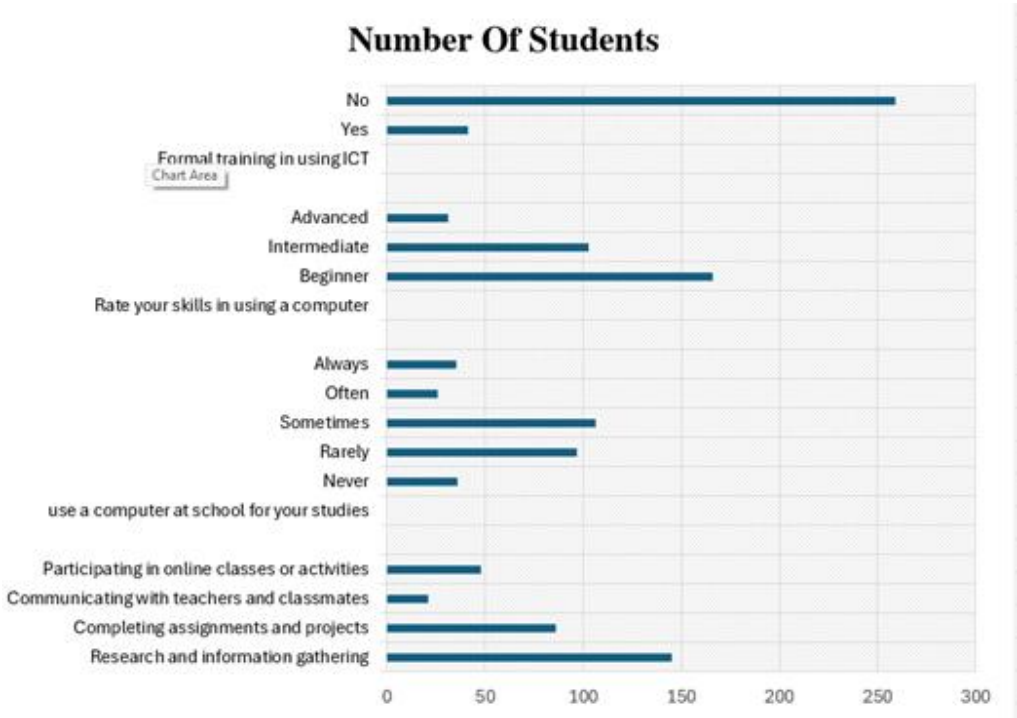
ICT usage and skills

The study shows that students use ICT 48% to carry out research and information gatherings using different platforms, 29% use it for completing their assignments and projects, they also use 7% for communicating with their teachers and classes mates, and 16% use it for participating in online courses and activities. This, therefore, implies that most of the time, the students use ICT mostly to do their research and information gathering and to do the projects and assignments given to them by their teachers. Studies show that students sometimes use computers for their studies quantitatively at 35%, and many of them rarely use computers 32%, 12% of the students never use computers in their studies at all, 12% of them always use a computer, and 9% of them often use it. Many of the students, 55% are beginners yet learning the ICT fundamentals; 34% of the students also have intermediate, meaning they have some knowledge of how to use a computer, and 10% of the students show that they have advanced skills and knowledge of on how to use ICT skills. The research also indicates that 86% of the respondents have not received any formal training on the use of ICT, and only 14% have received formal training.

The findings show a significant correlation between ICT training and both advanced and frequent computer usage, enhanced and diverse usage of computers in learning activities, and higher training competency among trained students. However, while there is greater availability of ICT for use in research and assignments, as well as limited skills in effectively carrying out the use of ICT this shows a lack of effective use of ICT resources. This, in turn, calls for formative and developmental strategies in training and development for the basic skills and strands; and, in diversifying the use of ICT in groupware applications, particularly in collaboration technologies, and in learning management systems. Such gaps require strategic interventions with a view to offering the students the requisite skills for a new economic order and improving educational achievements. Below is illustrated in Figure 12.

Figure 12: Showing ICT Usage and Skills



The students face several challenges, according to the study for stance limited ICT Skills in school at 31%, lack of access to ICT resources at 27%, inadequate ICT support standing at 16%, poor or

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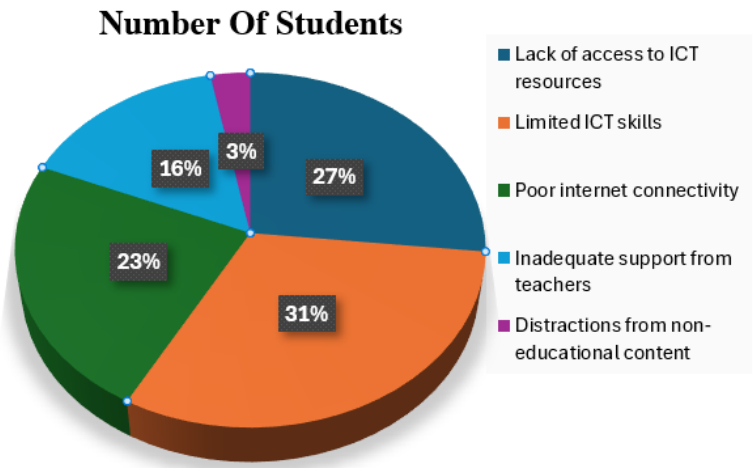
no internet connectivity at 23%, and destruction from non-education content at 3%.

Figure 13: shows the challenges and Number of students in Schools



The teachers suggested several ways to address ICT performance in schools. They include an Increase in the number of ICT equipment and infrastructure to cater to the growing number of students, organizing workshops for teachers, more funds allocated for ICT since it is capital intensive, training of teachers on ICT, Power lines be installed in all the classrooms, Educational software to be installed to enhance teaching and learning, lobbying of the fund to build more robust ICT infrastructure, Provide full-time ICT Support staff, making ICT compulsory among teachers so that teachers can teach the learners using computers, internet installation.

The respondents or students have made several suggestions to address the problems facing the schools, including making ICT compulsory among teachers and students, providing more computers in school to support teaching and learning, and employing more well-skilled ICT teachers. Some schools did not even have professional ICT teachers. Increase and renovate ICT infrastructure and Internet installation, Organize ICT training for both students and teachers, Create ICT clubs in schools, encourage teachers to take ICT seriously, and encourage frequent training and workshops.

Qualitative Analysis

The qualitative analysis indicates that (1) ICT Infrastructure and Accessibility -Most of the administrators argued that they don't have minimum ICT equipment, and the majority have no access to these facilities; (2) Integration of ICT in teaching and Learning - The administrators stressed that ICT is mostly only integrated in computer studies or ICT for A-level students using educational software. They struggle with the new lower secondary curriculum, and most of the teachers are not comfortable and proficient with these tools: (3) ICT Management and Technical Support. The administrator confirmed that they have very minimal or no technical support; (4) In the future, the majority of the staff argued there is a need to upgrade, renovate, and better ICT infrastructure to increase access to technology for both the teachers and the learners; and (5) The administrators stressed that the significant challenge they face is securing funds for ICT development. They suggest that funding and partnerships would improve the schools.

CONCLUSION

This research paper provides a general analysis of the practical application and management of ICT to enhance the performance of Ugandan secondary schools in West Nile. The study provides the transformed impacts of ICT in

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improving educational findings, administration efficiency, and communication within the education sector. However, it is necessary to adequately address the existing status of the ICT infrastructural problem, identify numerous challenges and opportunities in line with the integration of ICT, and examine its use and link with the students. Since a tiny percentage of schools have relatively adequate resources, it is evident that investment in ICT infrastructural development is critical to facilitate teaching and learning.

The findings can enable policymakers, educationists, and various stakeholders to take several steps to improve and address ICT integration and support educational technological advancement. This study identifies key challenges of inadequate ICT infrastructure, teacher training, and resources needed for schools in the West Nile region of Uganda as well as encouraging signs of change. At present, a limited number of schools have been able to provide students with enough ICT resources, evidence of the need for deliberate efforts to fill the infrastructure deficit. Lack of teacher training in ICT is an area that needs to be addressed; most teachers receive little or no training and more often, where training is available, the improvement of the quality of ICT use in teaching and learning takes time to be experienced. A considerable number of teachers fail to integrate ICT tools in classroom practice when they can provide a personalized and interesting learning environment. Other factors include inadequate infrastructure ability such as poor internet connection, scarcity of resources, and resistance to change that limit the use of ICT in the region. Also, it will be revealed that at present many students cannot use ICT resources at school and home, which limits their chances to learn Information Technology and to receive effective learning supported by technologies. The implications are clear: Specific investment priorities are needed in infrastructure, teacher development, and student's access to these resources. To the students, ICT brings revolutionary changes in that it allows self-learning, the availability of a wide range of instructional resources, and the utility of technology-enhanced instruments. Concerning these disparities, it is possible to help students in West Nile gain or develop 21st-century skills to minimize educational disparities as well as improve performance. Through the above recommendations, schools in West Nile will be able to set an example of how more ICT-promoted education can be achieved in Uganda to produce comprehensive and quality education. Closing these gaps can change education in West Nile and provide a possible pattern for the improvement of outcomes throughout Uganda.

RECOMMENDATIONS

There are several ways used to address ICT performance in Ugandan Secondary schools in West Nile, including: -

- Need to lobby for funds to build a more robust ICT infrastructure - Many times, developing a sustainable ICT framework in West Nile's schools calls for outside help. As shown by the experience of transitional economies, lobbying for funds within governmental institutions, non-governmental organizations, or the international donor community can be essential to obtaining financial resources for long-term ICT development. This advocacy can concern needs such as Internet connection, devices, and training, showing in detail to potential funders how these advances will solve educational issues and enrich community lives. This can be addressed through; (1) Government grants and subsidies -Leverage on the establishment of special ICT funding from a rural School to enable them to buy and support vital facilities such as computers, projectors, and solar systems; (2) Donor support alignment - Engage international donors and NGOs to provide long-term investment yields in ICT physical backbone infrastructure for the rural areas; and (3) Budget reallocations - Improve inclusiveness of funds for education provision with a focus for the poorly equipped areas such as West Nile region.

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- Support the schools in employing technical and qualified ICT Support professional staff - Some of the key human capital requirements for use in schools include technicians; trained ICT support staff are needed to monitor maintenance and solve problems related to the technology. Employing technical staff is strategic for schools because they can fix ICT problems quickly before they get out of hand, allowing schools to use ICT most in learning institutions. Also, these professionals can educate teachers and students to enhance the use of technology in school, ensuring that they support the school so that the outcome is a positive attitude towards the use of technology.

- Retooling teachers and making ICT compulsory among teachers so that they teach learners using computers - Retraining teachers with ICT knowledge and other competency skills that make competency in ICT a must for teachers guarantees that teachers are ready to factor technology in their teaching and learning process. This approach may, therefore, include establishing training initiatives and or certification courses that deal with the education in using computers and other ICT resources. When ICT is part of the teacher's professional functioning, learners can experience an ICT-enhanced learning environment.

- Allocate more funds to ICT since it is capital-intensive - ICT integration within school systems is a capital-intensive exercise that involves setting an account for procuring the equipment, maintaining assets, renewing structures, and training. Sufficient school funding means the schools are always able to update their technological equipment, which is very important since technology is improving so fast. These include the lack of adequate financial support for ICT projects since they may turn an older technology and become less useful or productive.

- Increasing ICT equipment and infrastructure to cater to the growing number of students - Teaching and learning activities imply that students consistently demand computers and other ICT resources. Schools that want to accommodate all these students must find ways of acquiring additional facilities. This ranges from purchasing more computers, tablets, projectors, and smart boards for lessons so that more students make use of these in lessons. Also, setting aside specific computer centers and upgrading existing workstations are some of the requirements. This way, the frequency with which the students can access the devices and access points is increased; therefore, ICT becomes easily integrated into the daily educational practice.

- Improving the existing ICT infrastructure through renovation and installation of reliable Internet connectivity - Functionality and the continual updating of the existing ICT systems require the way forward to focus on the refurbishment of these structures. Other improvements related to the use of ICT include a stable Internet connection, upgraded software, and secure networks, among others. Of all the essential components, it is easy to agree that reliable internet connectivity could assist in providing teachers and students with appropriate online resources, digital learning platforms, and virtual collaboration tools that could significantly enhance ICT use.

- Need to organize workshops for teachers and students on ICT training frequently - The teachers and students should have common ICT workshops and training about matters relating to ICT. These workshops range from the essentials of using a computer and specific software house to how to browse the internet and even noteworthy issues such as cyberbullying or the right use of the internet. These are the following: enabling teachers to be more prepared in the use of ICT for lesson delivery and helping students to achieve competency in utilizing technology for research, lessons, and other tasks. It enhances confidence in ICT and its usage and this way,

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the users are more frequently trained to use the technologies.

- Install educational software on school computers to enhance teaching and learning - Loading curricular software into the school system enables teachers to add soft, interactive, and multimedia elements into their teaching processes. Such software can include special applications relating to subject matters, books in the form of text, learning management software, and simulation software on subject areas such as science and mathematics. By offering students games, schools may increase students' interest, increase their comprehension level, and tailor learning to fit individual learners.

- Encouraging and empowering the creation of ICT Clubs in schools requires teachers to take up ICT seriously - ICT clubs are invaluable in the ability of students to practice and produce projects in the use of Information Technology beyond classroom education. Such clubs may compel students to apply ICT in ways that cultivate a school that embraces technology. These clubs ensure that teachers are empowered and committed to the direction, support, and facilitation of these extracurricular activities. At the same time, the students benefit by gaining real and practical experience in using ICT to boost their passion and knowledge of technology.

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