



East African Journal of Information Technology

eajit.eanso.org

Volume 8, Issue 1, 2025

Print ISSN: 2707-5346 | Online ISSN: 2707-5354

Title DOI: <https://doi.org/10.37284/2707-5354>



EAST AFRICAN
NATURE &
SCIENCE
ORGANIZATION

Original Article

Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance

Dr. Anne Ampaire, PhD¹*, Asst. Prof. Josephine Esaete, PhD¹ & Asst. Prof. Loyce Kiiza Kobusingye, PhD²

¹ Makerere University, P. O. Box 7062, Kampala, Uganda.

² Mountains of the Moon University, P. O. Box 837, Fort Portal, Uganda.

* Author for Correspondence ORCID ID; <https://orcid.org/0000-0003-2874-1938>; Email: nampaine@gmail.com

Article DOI: <https://doi.org/10.37284/eajit.8.1.3232>

Date Published: ABSTRACT

30 June 2025

Keywords:

*ICT in Education,
Digital Learning,
Virtual Platforms,
Technology,
Online Learning.*

Integrating digital tools has significantly transformed education systems, especially after the COVID-19 pandemic, leading to a paradigm shift in teaching and learning. This study examined how Information and Communication Technology (ICT) influences the academic performance of secondary school students in Uganda. A qualitative exploratory design was adopted, involving purposive interviews with 80 students. The findings reveal that despite the challenges of high digital costs, students have widely embraced ICT in learning. Online platforms enhance student engagement and help clarify abstract concepts through simulations and demonstrations. Students can share learning content with peers and teachers on virtual platforms. Moreover, ICT tools supplement classroom instruction, bridge knowledge gaps, and empower learners to develop independent study habits and personalised learning strategies. The study concludes that ICT is a transformative force in education. It recommends developing and implementing a comprehensive national policy to support Uganda's Digital Agenda Strategy (2021–2025). It further advocates for expanded digital infrastructure in all schools and subsidies on internet access and digital devices to ensure equitable access.

APA CITATION

Ampaire, A., Esaete, J. & Kobusingye, L. K. (2025). Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance. *East African Journal of Information Technology*, 8(1), 297-309. <https://doi.org/10.37284/eajit.8.1.3232>.

CHICAGO CITATION

Ampaire, Anne, Josephine Esaete and Loyce Kiiza Kobusingye. "Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance". *East African Journal of Information Technology* 8 (1), 297-309. <https://doi.org/10.37284/eajit.8.1.3232>.

HARVARD CITATION

Ampaire, A., Esaete, J. & Kobusingye, L. K. (2025) "Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance", *East African Journal of Information Technology*, 8(1), pp. 297-309. doi: 10.37284/eajit.8.1.3232.

IEEE CITATION

A. Ampaire, J. Esaete & L. K. Kobusingye "Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance", *EAJIT*, vol. 8, no. 1, pp. 297-309, Jun. 2025.

MLA CITATION

Ampaire, Anne, Josephine Esaete & Loyce Kiiza Kobusingye. "Integration of Information Communication Technology in Education in Ugandan Secondary Schools: Prospects for Improved Academic Performance". *East African Journal of Information Technology*, Vol. 8, no. 1, Jun. 2025, pp. 297-309, doi:10.37284/eajit.8.1.3232.

INTRODUCTION

The proliferation of Information and Communication Technology (ICT) has transformed nearly every aspect of human life, including education (Kizito *et al.*, 2020; Agoritsa *et al.*, 2021). In recent years, especially during and after the COVID-19 pandemic, ICT has increasingly influenced pedagogy, leading to a shift in how teaching and learning are delivered in secondary schools (Tumwesige, 2020; Faturoti, 2022). Notably, embracing ICT in education promotes the use of electronic tools to manage learning processes and improve outcomes (Lee *et al.*, 2020).

Technology-based instruction encompasses diverse platforms including online portals, video conferencing tools, mobile applications, websites, and other digital resources (CIPD, 2020). These tools offer practical, flexible, and dynamic alternatives to traditional teaching methods through enhanced accessibility, interactivity, and engagement (McDiarmid & Zhao, 2022; Radianti *et al.*, 2020). ICT allows learning beyond the physical classrooms, providing opportunities for anytime-anywhere learning, especially in regions where digital infrastructure is functional (Faturoti, 2022; Taylor *et al.*, 2020; Öztürk, 2021).

In Uganda, the government has responded to the digital shift by introducing the Education Digital Agenda Strategy 2021–2025, aimed at improving access to quality education through ICT. This strategy aligns with Uganda's Vision 2040 and National Development Plan III, which advocates for the inclusion of students with diverse learning

needs, abilities, and experiences (Kagoro, 2024; Matege, 2024). Nevertheless, there are implementation challenges manifested in the absence of a comprehensive ICT policy for schools and restrictions on the use of handheld devices, which are often limited to laboratory computers (Matege, 2024). Despite this, many students continue to use digital tools both in and outside of school, although this practice has remained discretionary, individualised, and often school-led and inconsistent (Natukunda, 2022).

Emerging evidence shows that ICT can increase student motivation and engagement, thereby improving learning outcomes (Rahim & Chandran, 2021). For instance, a quasi-experimental study demonstrated that computer simulations in teaching chemistry improved test performance compared to traditional methods (Sentongo *et al.*, 2013). However, limited research has been conducted on ICT's role in enhancing student interest, improving access to materials, and promoting independent learning skills at the secondary school level.

Theoretical Framework

This study is guided by Davis' (1989) Technology Acceptance Model (TAM), which explains how users adopt new technologies that are based on perceived usefulness and ease of use. According to TAM, students are more likely to engage with digital tools that are simple, useful, and empowering in their learning journeys. TAM advocates for the training of digital users to attain expertise that will put them in charge of educational technologies in different learning settings for improved outcomes.

Owing to this, the study investigated the influence of ICT on academic performance among secondary school students in Wakiso District, Uganda. Specifically, it examined how ICT stimulates students' interest in learning, improves access to educational resources, and supports the development of independent study skills.

LITERATURE REVIEW

The integration of Information and Communication Technology (ICT) into education has significantly enhanced teaching and learning by expanding accessibility, interactivity, and personalisation (Shahzad *et al.*, 2021). Digital technologies are now widely used both at school and at home, providing learners with diverse opportunities to access and apply knowledge in life situations (Ranchordás, 2020). ICT-based platforms facilitate quicker access to educational resources, reducing dependence on traditional, print-based materials (Agoritsa *et al.*, 2021; Öztürk, 2021). This shift represents a global transformation in pedagogy that prioritises student-centred learning styles and technology-based instruction.

However, research acknowledges the enduring importance of face-to-face instruction in this global era. Better still, the hybrid learning models that combine traditional and digital methods are increasingly recognised for their ability to improve academic performance and learner engagement (Preeti, 2020). Despite the advantages offered by ICT, effective integration requires more than access to tools. It demands educator readiness, ongoing professional development, and coordinated institutional leadership (Almaiah *et al.*, 2020; Tadesse & Muluye, 2020). Teachers, in particular, are central to guiding the meaningful adoption of ICT in diverse classroom contexts.

ICT has been found to bridge knowledge gaps by offering multiple pathways for understanding complex concepts (Adnan & Anwar, 2020; Buchholz *et al.*, 2020). Digital learning environments support student autonomy and

provide interactive tools that foster active participation and cognitive engagement (Fokides & Kefallinou, 2020). Technologies such as simulations, games, and video content are particularly effective in making abstract content more relatable and accessible (Tailor *et al.*, 2021; Williams, 2020).

In addition to enhancing individual learning, ICT fosters collaboration among students and teachers. Virtual platforms enable peer interaction, group discussions, and content sharing that extend beyond the traditional classroom (Fingal, 2020; Taylor *et al.*, 2020). Such collaboration supports a learner-centred approach and allows students to engage at their own pace while exploring topics through personalised learning paths (Keskin *et al.*, 2022; Ranchordás, 2020). These tools also help educators tailor instruction to accommodate different learning styles, learner needs, and abilities.

Moreover, the integration of audiovisual tools and immersive technologies contributes to deeper learning by linking content to real-life experiences. Studies have emphasised that audio-visual materials and simulations not only improve comprehension but also boost retention and motivation, particularly in STEM subjects (Peimani & Kamalipour, 2021; McDiarmid & Zhao, 2022; Radianti *et al.*, 2020). Game-based learning has also been shown to increase student attention and application of knowledge (Sentongo *et al.*, 2013; Tapingkae *et al.*, 2020).

Digital learning is characterised by flexibility and innovation, which allows learners to interact with content at their own pace and revisit learning materials as needed (Rapanta *et al.*, 2021). In contrast, traditional teaching methods are often rigid and less responsive to learners' contexts and aspirations (McDiarmid & Zhao, 2022; Radianti *et al.*, 2020). The integration of emerging technologies, including artificial intelligence (AI), is reshaping the educational landscape and making

digital competence an essential skill for students (Tan, 2023; Tapalova & Zhiyenbayeva, 2022).

The literature evidence suggests that academic success increasingly depends on students' ability to navigate digital environments and engage with technology-enhanced content (Charles *et al.*, 2024; Agoritsa *et al.*, 2021). Traditional pedagogy is a majorly textbook-based, lecture-driven instruction and often struggles to maintain relevance in today's rapidly changing world (Solís *et al.*, 2022). In contrast, ICT facilitates inquiry-based and experiential learning through access to virtual laboratories, interactive tutorials, and real-time feedback (Louis *et al.*, 2021; Rapanta *et al.*, 2021).

Overall, the literature highlights both the strengths and limitations of digital learning for growing economies. There is a need for a human-centred approach to ICT integration that acknowledges students' lived realities, promotes inclusion, and prepares both teachers and learners for equitable and effective digital learning environments (Agoritsa *et al.*, 2021; McDiarmid & Zhao, 2022; Radianti *et al.*, 2020).

MATERIALS AND METHODS

Research Design

This study employed a qualitative exploratory design to gain an in-depth understanding of how secondary school students in Wakiso District, Uganda, experience the integration of Information and Communication Technology (ICT) in their learning. A qualitative approach was chosen for its ability to uncover rich, contextualised insights into participants' perceptions, attitudes, and behaviours, especially in areas that are not easily quantified (Hunter *et al.*, 2019). Exploratory designs are particularly well suited for examining emerging phenomena such as digital learning in under-researched educational settings.

Study Area

Wakiso District was selected as the geographical focus because it is one of Uganda's most socioeconomically diverse regions. It encompasses a broad range of secondary schools from highly resourced private institutions to underfunded public schools, hence making it representative of the broader national educational landscape. This diversity allowed the study to capture voices across socioeconomic, academic, and technological divides, providing a more inclusive reflection of ICT usage in Uganda's secondary education system.

Sampling and Selection of Participants

Purposive sampling was used to select 80 students from both Ordinary Level (O-Level) and Advanced Level (A-Level) secondary schools within Wakiso District. Equal representation of male and female students was maintained, with 40 participants drawn from each level. To ensure relevance to the study objectives, only students who had used digital learning tools, whether at school or at home, participated in the study. Schools were selected from different categories of urban, peri-urban, and rural to represent the diversity of student experiences. Special attention was given to participants from both affluent and low-income backgrounds to understand the realities of ICT access and usage across the district.

Data Collection Procedure

Data were collected using a semi-structured interview guide developed to explore students' experiences, perceptions, and challenges in using ICT for learning. Interviews allowed participants to narrate their experiences in their own words, encouraging authentic and detailed accounts (Opdenakker, 2009; Winwood, 2019). This method was intentionally chosen to offer students a platform to express ideas that may not have been anticipated by the researcher.

Student interviews were conducted within the school premises. Interviews were carried out in

English and lasted approximately 20 to 30 minutes each. Participation was voluntary, and all students provided verbal informed consent, while the school authorities gave assent for minors and permission where required. The emphasis on voluntary participation was crucial for building trust and encouraging open and honest responses.

Ethical Considerations

All participants were informed about the purpose of the study, their right to withdraw at any point, and the measures taken to ensure confidentiality and anonymity. Pseudonyms were used in transcripts and reporting to protect participant identities. Data were securely stored and accessible only to the researcher.

Data Analysis

The interview data were transcribed verbatim and analysed using thematic content analysis (Harwood & Garry, 2003; Kleinheksel *et al.*, 2020). A coding framework was developed inductively from the data, allowing for the emergence of themes that reflected participants' lived experiences with ICT. Codes were grouped into categories such as access to devices, learning motivation, digital skills, challenges faced, and coping strategies. A master coding sheet was used to organise and sort data for clarity.

Although the analysis was qualitative, descriptive statistics of frequency counts and percentages were occasionally used to indicate how common certain themes were among participants. For example, noting how many students mentioned internet affordability or the use of simulations helped contextualise patterns in the data. These summaries were supported by direct quotations from participants, used to enrich the findings and ensure authenticity.

RESULTS

This section presents the findings of the study based on qualitative data collected from semi-structured

interviews with 80 secondary school students in Wakiso District, Uganda. The analysis was guided by a thematic content approach, which involved coding interview transcripts and organising responses into major themes and subthemes that emerged directly from the participants' narratives. Three central themes were identified through this process, namely: Learning Interest Stimulation and Academic Engagement, Access to Learning Materials and Digital Content, and Development of Independent Study Skills through ICT. These themes reflect students' lived experiences with digital learning tools and how tools influence motivation, access to educational content, and learning autonomy. Participant voices are integrated throughout the section to highlight the depth and authenticity of the findings.

The first theme explores how ICT tools stimulate students' interest in learning and promote active academic engagement.

Theme 1: Learning Interest Stimulation and Students' Academic Engagement

The study findings revealed that the integration of ICT significantly enhanced students' interest in learning, which in turn contributed to increased academic engagement and improved performance. Across the data, students consistently described how digital platforms, especially interactive applications and video-based content, made learning more exciting, accessible, and easier to understand. As shown in Table 1, the majority of participants ($n = 78$; 98%) reported that digital applications were highly engaging and easy to follow. These tools provided opportunities for active participation, repeated practice, and independent exploration, which students found highly motivating. A large number ($n = 76$; 95%) also emphasised that online teaching, particularly through simulations and visual demonstrations, made complex and abstract content easier to grasp and remember. The results are presented in Table 1.

Table 1: Student Perspectives on ICT and Learning Interest (n = 80)

Thematic Item	Frequency (F)	Percentage (%)
Online apps are engaging and easy to follow	78	98
Online teaching offers simple, visual examples	76	95
ICT allows interaction with global educators	77	96
ICT enables repeated access to learning content	70	88
ICT minimises the impact of teacher bias	68	85
ICT supplements library and textbook resources	73	91
ICT compensates for unclear teacher explanations	69	86
ICT provides quick assessment via AI tools	68	85

Source: Field Data (2024)

Findings in Table 1 indicate that digital learning technologies, especially those accessible via smartphones, tablets, and computers, have created new spaces where students can engage more meaningfully with content. One O-Level male student shared the following:

“I wanted to make a treadmill for my O-Level final exams, but I was confused and I didn’t know how to go about it. When I searched on Google, I found a variety of demonstrations in videos that explained everything clearly. It made my work much easier, and many of my classmates used a similar method to learn.”
(Male Student A, November 12, 2024)

This narrative illustrates how access to online resources can help transform abstract-unfamiliar tasks into manageable learning opportunities. The ability to watch demonstrations, replay them multiple times, and compare different explanations allowed students to take greater control over their learning processes.

Students also highlighted the value of ICT in enabling global academic exposure. Nearly all participants (96%) noted that online platforms allowed them to connect with a wide range of educators, teachers, and content creators beyond the local school context. One A-Level female student remarked:

“Through online platforms like YouTube, TikTok, and Google, I’ve learned from teachers in Canada, India, and the U.S. It’s like having access to professors from everywhere, which helped us to understand the content better.”
(Female Student C, November 8, 2024)

This statement reflects the extent to which students view ICT as a gateway to high-quality, international academic content. Such access reduces their reliance on a single teacher’s explanation and contributes to richer, more varied perspectives on the subject matter.

Additionally, students described how digital tools supported repeated engagement with learning content. This flexibility was especially important when classroom instruction was rushed or unclear, especially to increase the content coverage. One student explained:

“Sometimes the teacher is too fast or not easy to approach. On my own, I can replay the video or check other explanations online until I understand.” (Male Student B, November 10, 2024)

Beyond addressing content gaps, ICT also appeared to mitigate negative teacher-student dynamics. Some students shared that they found it easier to ask questions online or to consult alternative sources when teachers were perceived as unapproachable.

This flexibility increased their confidence and sustained motivation to learn independently.

Finally, many participants recognised that ICT complemented limited school library resources. Instead of relying solely on physical textbooks or teacher notes or even hand-written notes, students frequently accessed online materials, experiments, and simulations. This made learning more inclusive, interesting, and equitable, particularly in under-resourced schools.

Theme 2: Access to Learning Materials and Digital Content

The second major theme that emerged from the data relates to how ICT enhances students' access to educational materials. Students overwhelmingly described digital platforms as a gateway to a wealth of content that is both accessible and high in quality. This increased access has empowered students to take control of their learning processes, reduce dependency on limited physical resources, and also

contributed to a more inclusive learning environment.

As illustrated in Table 2, students reported that digital learning tools significantly eased access to a wide variety of academic materials. All participants (n = 80; 100%) stated that they could easily locate subject-specific content using search engines or educational apps. The use of keywords and search terms enabled quick retrieval of targeted information, which reduced the time students previously spent searching through printed textbooks and library catalogues.

In addition, 93% of the respondents noted that they were able to find multiple teachers or content creators online explaining the same topic, which allowed them to compare explanations and gain a deeper understanding of difficult concepts. A majority of students (87%) also indicated that they appreciated the opportunity to cross-check information across different sources, which supported the development of critical thinking skills.

Table 2: Student Responses on ICT and Access to Learning Materials (n = 80)

Thematic Item	Frequency (F)	Percentage (%)
Learning materials are easy to locate using digital apps	80	100
Access to a variety of teachers online for the same subject	74	93
Ability to compare content across platforms	70	87
Students can learn anytime and anywhere if data is available	80	100
Equal access to high-quality materials across schools	78	98

Source: Field Data (2024)

One female student from an under-resourced school expressed the impact of this accessibility:

“When I search online, I find notes, videos, and examples that I cannot find in our school library. Even if we don’t have enough textbooks, I still feel I can learn as much as students from big schools.” (Female Student D, November 10, 2024)

This account reflects how ICT helps to bridge resource disparities between well-equipped and

less-equipped schools. Students expressed that even in environments where libraries were limited or outdated, digital platforms provided relevant, up-to-date learning materials.

Additionally, all students confirmed that digital learning platforms support anytime-anywhere learning, provided data and devices were available. This flexibility was particularly important for those who shared learning devices at home or needed to study outside regular school hours. As one A-Level male student shared:

“I revise at night when others are asleep. My phone helps me read at my own time. Even during weekends or holidays, I don’t have to wait for the school to reopen.” (Male Student F, November 9, 2024)

This highlights the transformative role of ICT in removing traditional barriers of time and physical presence in a learning environment. Students who previously depended solely on classroom time for instruction are now able to continue learning independently beyond the school premises.

Moreover, participants emphasised that digital learning has created a more equitable educational environment. By accessing the same high-quality content from the internet, students from different schools, regardless of geographical location or resource availability, felt they were actively participating in a shared academic space. One student noted:

“Even if I’m from a small school, I now learn the same things as students in big city schools. We all use the same internet and get the same educational materials.” (Male Student G, November 16, 2024)

This sense of academic inclusiveness underscores the role of ICT in promoting fairness in access to knowledge and academic engagement. It also suggests that digital learning tools can contribute to reducing inequalities in Uganda’s education system when infrastructure and internet connectivity are reliably in place.

Theme 3: Development of Independent Study Skills through ICT

The final theme that emerged from the analysis highlights the role of ICT in developing students’ study skills while promoting self-directed learning. Participants expressed that digital tools empowered them to own the learning process, allowed personalised study experiences, and the acquisition of essential academic-digital competencies. As summarised in Table 3, all participants (n = 80; 100%) reported that ICT integration allowed them to study at their own pace. Many students appreciated the flexibility digital platforms provided, which enabled them to engage with academic resources on their preferred time, rhythm, and learning style. Additionally, 76% indicated that online applications guided them in navigating learning content independently, while 83% reported acquiring practical ICT skills applicable beyond the classroom context.

Table 3: Student Responses on ICT and Study Skills (n = 80)

Thematic Item	Frequency (F)	Percentage (%)
ICT promotes independence in study pace	80	100
Online platforms help students explore content independently	61	76
ICT use builds useful academic and digital skills	67	83

Source: Field Data (2024)

Many students emphasised that ICT allowed them to manage their learning more effectively. The ability to access content multiple times, pause and replay videos, or even switch to alternative explanations helped them develop confidence and academic discipline, particularly in self-guided study. One student explained:

“With online apps, I study when I feel most focused, and I don’t have to wait for the teacher. I just open the site and go through online materials until I understand.” (Male Student B, November 10, 2024)

This independence fostered self-motivation and a sense of control over their educational journey. Several students described how the use of digital

tools reduced reliance on classroom instruction and enabled them to find answers on their own. As one female student shared:

“ICT makes me feel more confident. When I use digital tools, I can try, fail, and try again without fear. It helps me trust myself more with schoolwork.”

(Female Student E, December 5, 2024)

Additionally, students noted that digital learning environments often required them to explore unfamiliar tools, platforms, and content formats on their own. This process strengthened their ability to discover, evaluate, and organise information. These skills are essential for academic integration and success. One student reflected:

“Sometimes when we are given group work, I search the topic online before we meet. I come with ideas. It helps me think better and not just copy what others say.”

(Male Student C, November 3, 2024)

Students acknowledged that regular use of ICT had helped them to develop wider digital literacy skills beyond the academic benefits. These included typing, researching, formatting documents, class presentation, and using software applications. These skills are increasingly necessary for both higher education and employment. A female student from an A-Level class shared:

“Because of using computers to learn, I now know how to type, search for information, and even create my notes. These skills help in other parts of life, not just school.”

(Female Student G, November 13, 2024)

Some students also spoke about how ICT tools supported them with different paces and learning needs. One student described how they used digital content to manage difficulties in understanding classroom content:

“I’m a slow learner in class, but with online, I can pause and repeat the video. I don’t have to

ask the teacher again and again. It helps me learn in my way.”

(Male Student D, November 18, 2024)

This narrative suggests that ICT promotes not only autonomy but also inclusiveness, allowing students with diverse learning preferences, abilities, and challenges to participate fully and succeed academically.

DISCUSSION

This study explored the influence of Information and Communication Technology (ICT) on academic performance among secondary school students in Wakiso District, Uganda. Three key themes emerged: the role of ICT in stimulating student interest, enhancing access to learning materials, and promoting independent study skills. These findings contribute to a growing body of literature affirming the transformative role of digital technologies in education, particularly in low- and middle-income educational contexts.

ICT-Facilitated Learning: Promoting Motivation and Student Engagement

Findings from the study underscore that ICT tools, in terms of educational apps, simulations, and online platforms, serve as powerful motivators for student engagement. Students reported that digital resources made learning more exciting, helped demystify abstract concepts, and enabled them to explore learning content through visual and interactive formats. This aligns with prior research indicating that technology-based learning increases motivation and cognitive engagement (Fokides & Kefallinou, 2020; Taylor *et al.*, 2021).

The results also resonate with the Technology Acceptance Model (TAM), which posits that the perceived usefulness and ease of use of technology significantly influence user acceptance (Davis, 1989). Students in this study found ICT both accessible and effective, which explains their willingness to adopt it. More still, ICT was found to mitigate certain classroom barriers such as limited

teacher interaction, overreliance on instructional time, and further increase learner agency and enthusiasm for learning.

Equitable Access to Learning Resources in a Digital Age

Another important finding was the extent to which ICT improved access to educational learning materials. All participants affirmed that digital tools enabled them to locate and use materials that were otherwise unavailable in their schools, particularly those with under-resourced library infrastructural facilities. This finding echoes earlier studies that emphasised ICT's role in bridging educational inequalities and expanding access to quality content (Rapanta *et al.*, 2021; Solís *et al.*, 2022).

Students described using digital platforms to interact with diverse teachers, compare explanations, and revisit topics and illustrations multiple times. These practices foster deeper learning and critical thinking skills that are central to competence-based education. The findings suggest that ICT can promote an inclusive learning environment amidst infrastructural limitations, such as internet access and device availability (Peimani & Kamalipour, 2021).

Fostering Independent Learning and Study Skills

ICT also emerged as a key enabler of self-directed learning. Students shared how they used digital tools to study at their own pace, revisit difficult content, and build confidence in solving academic problems independently. This supports the argument that technology not only supplements traditional instruction but also cultivates learner autonomy, an essential trait for lifelong learning in a fast-changing world (Adnan & Anwar, 2020; McDiarmid & Zhao, 2022).

Furthermore, students reported developing essential digital literacy skills, such as researching online, navigating educational platforms, and evaluating sources. These competencies are increasingly

critical for both academic achievement and future employability in the digital economy (Louis *et al.*, 2021). The study findings suggest that integrating ICT in secondary school education offers long-term benefits that extend beyond the improved test scores.

Theoretical Implications

This study reinforces the relevance of the Technology Acceptance Model (TAM) in understanding students' interaction with educational technology. Students' positive attitudes toward ICT adoption reflect high perceived usefulness and ease of use, which are critical elements of TAM. However, the study also highlights the role of contextual enablers such as digital infrastructure, teacher support, and socio-economic factors in shaping these perceptions. Thus, the model may be strengthened by integrating external factors more explicitly, especially in low-resource environments where infrastructure and access to ICT learning are not guaranteed.

Practical Implications and Recommendations

- i) The findings from the study have practical significance for educators, head teachers, curriculum developers, and policymakers:
- ii) The study calls for strengthening the teacher capacity through professional development programs that focus not only on technical ICT skills but also on how to effectively integrate digital tools into lesson design and differentiated instruction.
- iii) There is a need to invest in school infrastructure, particularly in underserved areas that require reliable access to electricity, internet connectivity, and learning devices.
- iv) The need to promote equity in access to ICT education should include, among other things, the provision of subsidies and device-lending schemes for students from disadvantaged backgrounds to ensure that digital transformation benefits all learners.

v) Schools should adopt platforms with offline access, adaptive learning pathways, and self-assessment tools to support students in managing their academic aspirations.

Limitations of the Study

While the study offers valuable insights, some limitations must be acknowledged. First, the sample was limited to students in Wakiso District, which may affect generalizability to other contexts within Uganda and similar countries. Second, the study relied exclusively on student perspectives; however, critical they may be, they excluded standpoints from teachers, school administrators, and parents who partake in the learning environment. Lastly, the study was qualitative and did not quantify the impact of ICT on academic performance.

Future Research Direction

Future studies should incorporate mixed-methods designs to evaluate both qualitative experiences and quantitative academic outcomes associated with ICT use in developing economies. Longitudinal research could assess the sustained impact of ICT integration on learner performance, digital literacy, and post-school transitions. Additionally, research exploring gender disparities and the influence of teacher attitudes on student technology use would provide a more comprehensive understanding of ICT's role in education.

CONCLUSION

The findings of this study affirm that ICT can be a powerful tool in transforming secondary education when implemented equitably and thoughtfully. It enhances student motivation, expands access to educational content, and promotes independent, lifelong learning. However, realising these benefits requires a holistic investment in infrastructure, teacher training, and an inclusive digital policy. As one student aptly noted, *"When I use the internet to study, I feel like I'm not limited by what is missing in my school."* Grounded in students' experiences, the study contributes to the evolving narrative on

ICT as a vehicle for educational equity and empowerment.

REFERENCES

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45–51.
- Agoritsa, V., Vassilopoulou, A., & Pange, J. (2021). Exploring ICT use in education: A review of empirical evidence. *International Journal of Emerging Technologies in Learning (iJET)*, 16(2), 23–32. <https://doi.org/10.3991/ijet.v16i02.18455>
- Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the e-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, 25, 5261–5280. <https://doi.org/10.1007/s10639-020-10219>
- Buchholz, B. A., Ferm, L., & Holmgren, R. (2020). Teachers as designers of digital learning: How technology enhances STEM pedagogy. *Journal of Educational Technology Systems*, 49(1), 34–57.
- Charles, P., Matovu, J., & Nalukenge, M. (2024). Digital competence and academic achievement in Ugandan secondary schools. *East African Journal of Education and Social Sciences*, 5(1), 22–34.
- CIPD. (2020). *Technology in learning: Progress and potential*. Chartered Institute of Personnel and Development. <https://www.cipd.co.uk>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Faturoti, B. (2022). Digital pedagogy in African schools post-COVID-19: Opportunities and

- challenges. *African Journal of Educational Technology*, 12(4), 56–68.
- Fingal, D. (2020). 10 ways to engage students using technology. *ISTE Blog*. <https://www.iste.org/explore/learning-during-covid-19/10-ways-engage-students-using-technology>
- Fokides, E., & Kefallinou, A. (2020). Using educational apps to promote student engagement: A study in secondary schools. *Education and Information Technologies*, 25(2), 1911–1924.
- Harwood, T. G., & Garry, T. (2003). An overview of content analysis. *The marketing review*, 3(4), 479–498.
- Hunter, D., McCallum, J., & Howes, D. (2019). Defining exploratory-descriptive qualitative (EDQ) research and considering its application to healthcare. *Journal of Nursing and Health Care*, 4(1).
- Kagoro, A. (2024). Bridging Uganda's digital divide: The role of ICT in rural education. *Uganda Journal of ICT & Innovation*, 8(1), 49–61.
- Keskin, S., Özata, F. Z., & Arslan, H. O. (2022). Personalized learning in digital environments: A systematic review. *Journal of Educational Multimedia and Hypermedia*, 31(3), 315–337.
- Kizito, G. N., Nduhura, D., & Semambo, C. (2020). ICT adoption in Ugandan schools: Current trends and future prospects. *Makerere Journal of Education and Development*, 11(1), 75–90.
- Kleinheksel, A. J., Remington, A., & Schryer, C. F. (2020). Content analysis: Latent and manifest approaches in educational research.
- Lee, M., Zhang, P., & Wang, T. (2020). Technology-enhanced learning in the 21st century: Pedagogical frameworks and practices. *Educational Technology Research and Development*, 68, 2125–2145.
- Louis, R., Al Farsi, A., & Al Lawati, M. (2021). Developing digital literacy skills for higher education students. *International Journal of Education and Development using ICT*, 17(1), 1–17.
- Matege, J. (2024). Policy inconsistencies in Uganda's ICT-in-education strategy: A critical review. *African Policy Studies Journal*, 6(2), 101–113.
- McDiarmid, G., & Zhao, Y. (2022). The new grammar of schooling in the digital age. *Journal of Educational Change*, 23, 233–252.
- Natukunda, J. (2022). School-level ICT integration practices in Wakiso District: An exploratory study. *Uganda Education Review*, 9(3), 45–58.
- Opdenakker, R. (2006). Advantages and disadvantages of four interview techniques in qualitative research. *Forum: Qualitative Social Research*, 7(4). <https://doi.org/10.17169/fqs-7.4.175>
- Öztürk, R. (2021). ICT in secondary education: Trends, challenges, and policy perspectives. *International Review of Education*, 67, 127–147.
- Peimani, N., & Kamalipour, H. (2021). Equity in digital education: Addressing infrastructure gaps in marginalized communities. *Education and Information Technologies*, 26, 4223–4240.
- Preeti, T. (2020). Hybrid learning in schools: A new normal? *Journal of Education and Practice*, 11(5), 87–92.
- Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education*, 147, 103778.
- Rahim, A. R. A., & Chandran, M. (2021). Enhancing students' engagement through ICT

- tools in remote learning. *Malaysian Online Journal of Educational Technology*, 9(2), 23–33.
- Ranchordás, S. (2020). Digital literacy in the 21st-century classroom. *Educational Media International*, 57(1), 47–61.
- Rapanta, C., Botturi, L., Goodyear, P., Guardia, L., & Koole, M. (2021). Online university teaching during and after the COVID-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 3(3), 923–945.
- Sentongo, J., Kiggundu, R., & Kalema, R. (2013). Effects of computer simulations on chemistry students' performance in Uganda. *African Journal of Science Education*, 3(1), 11–20.
- Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Investigating the impact of e-learning system usage on students' academic performance. *Interactive Technology and Smart Education*, 18(2), 193–212.
- Solís, C., Alemán, M., & Villalobos, D. (2022). Teaching in the digital age: Rethinking pedagogy through ICT. *Latin American Journal of Educational Technology*, 16(3), 202–219.
- Tadesse, S., & Muluye, W. (2020). The impact of COVID-19 on education: Challenges and opportunities. *Journal of Education and Practice*, 11(13), 56–65.
- Taylor, R., Patel, J., & Patel, S. (2021). Effectiveness of simulation-based teaching in science subjects. *Journal of Educational Research and Practice*, 11(2), 59–70.
- Tan, S. (2023). Harnessing Artificial Intelligence for innovation in education. In *Learning intelligence: Innovative and digital transformative learning strategies: Cultural and social engineering perspectives* (pp. 335–363). Singapore: Springer Nature Singapore.
- Tapalova, E., & Zhiyenbayeva, A. (2022). Emerging trends in EdTech: Implications for global curricula. *Contemporary Educational Technology*, 14(3), 1–16.
- Tapingkae, W., Panjaburee, P., Hwang, G.-J., & Srisawasdi, N. (2020). Enhancing students' critical thinking skills through game-based learning: A literature review. *Educational Technology & Society*, 23(4), 20–35.
- Taylor, J., Mwaniki, D., Otieno, T., & Khamadi, L. (2020). E-learning in East African secondary schools: Prospects and challenges. *East African Journal of Education & Development*, 7(2), 88–97.
- Tumwesige, J. (2020). COVID-19 and the acceleration of digital learning in Ugandan secondary schools. *Journal of African Education*, 1(3), 43–60.
- Williams, A. (2020). Making learning stick: The impact of visuals in online education. *Teaching and Teacher Education*, 95, 103142.
- Winwood, J. (2019). Using interviews. In L. Cohen, L. Manion, & K. Morrison (Eds.), *Practical research methods in education* (pp. 12–22). Routledge.