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Influence of Teachers' Access to ICT Facilities on Students' Academic Success in Public Secondary Schools in Nyamagana District, Tanzania

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Abstract
This study examined the influence of teachers' access to Information and Communication Technology (ICT) facilities on students' academic success in public secondary schools in Nyamagana District, Tanzania. The study was guided by the Technological Pedagogical Content Knowledge (TPACK) theory. The paper adopted a mixed-methods approach using a convergent parallel design. The target population comprised 53,463 respondents, from whom a sample of 201 participants was selected, including 100 students, 92 teachers, 5 heads of schools, 3 Ward Education Officers, and 1 District Secondary Education Officer. Data were collected using questionnaires, semi-structured interviews, and direct observation. Quantitative data were analysed using descriptive statistics with SPSS version 26, while qualitative data were analysed thematically. The findings revealed that teachers' access to ICT facilities generally supported students' academic success by improving their understanding of complex concepts, promoting engagement in learning activities, and supporting examination preparation. Students also reported that ICT facilities helped them understand academic subjects and complete learning tasks more effectively. However, inadequate computers, unreliable internet connectivity, limited digital learning resources, and inconsistent integration of ICT into classroom instruction constrained the benefits of technology-supported learning. The findings suggest that the availability of ICT facilities must be accompanied by equitable student access, appropriate teacher guidance, and effective integration of technology with teaching methods and subject content. The study concludes that improving ICT accessibility and strengthening teachers' capacity to use digital resources meaningfully are important for promoting students' academic success. It recommends that the Nyamagana District Council and school management teams prioritize ICT provision, regular maintenance, structured student access, and continuous teacher professional development.

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INTRODUCTION

Information and Communication Technology (ICT) has become an important resource in improving teaching and learning in secondary schools. The integration of ICT facilities, such as computers, projectors, internet connectivity, and digital learning platforms, enables teachers to present lessons interactively, simplify difficult concepts, and provide students with access to diverse learning materials. These technologies can improve students' understanding, knowledge retention, classroom participation, and academic performance when appropriately integrated into teaching. Das and Middya (2025) and Ruijia et al. (2025) emphasize that ICT supports learner-centred teaching and personalized learning, while Lema et al. (2025) highlight the contribution of multimedia and digital tools to comprehension and the development of twenty-first-century learning skills. Therefore, teachers' access to adequate and functional ICT facilities is an important consideration in promoting students' academic success.

Despite the potential benefits of ICT, teachers' access to ICT facilities remains a major concern in many educational settings, particularly where schools experience inadequate infrastructure and limited technological resources. Access to functional computers, reliable internet connectivity, electricity, and appropriate digital teaching equipment determines whether teachers can consistently incorporate technology into classroom instruction. Adhikari (2021) identifies inadequate infrastructure, unreliable electricity, and limited internet connectivity as barriers to effective ICT utilization. Similarly, Ogar and Okon (2025) emphasize that financial constraints, insufficient teacher training, and other implementation challenges may limit the contribution of ICT to educational outcomes. Furthermore, Bariu (2020) observes that the availability of technology alone does not guarantee improved academic performance. These findings suggest that examining teachers' access to ICT facilities is necessary to understand the opportunities and limitations affecting technology-supported teaching and students' academic success.

Globally, evidence indicates that access to ICT facilities can support students' academic success when teachers use technology appropriately for instructional purposes. In the United States, Debrenti and Bella (2025) and Omer et al. (2025) associate interactive mathematics software with improved problem-solving and conceptual understanding when its use aligns with instructional objectives. In China, Fan et al. (2022) found that frequent and pedagogically guided ICT use was associated with improved student learning, while research in Sri Lanka identified inadequate infrastructure, unreliable electricity, and limited teacher training as barriers to effective ICT integration (Karunakaran & Dhanawardana, 2023). Similarly, evidence from East Africa indicates that limited technological resources and inadequate teacher competence can restrict the effective use of ICT in teaching and learning (Bariu, 2020; Arineitwe et al., 2025; Kagambe et al., 2024). These findings demonstrate that teachers need access to reliable ICT facilities to create meaningful learning opportunities. However, the extent to which teachers' access to these facilities influences students' academic success may differ according to the resources and conditions available in individual school settings.

In Tanzania, the government has undertaken various initiatives to strengthen ICT integration in education through infrastructure development, teacher training, and the provision of digital learning resources. According to the Ministry of Education, Science and Technology (2025), these efforts have included programmes supporting teacher capacity-building, digital pedagogy, school connectivity, and the development of digital learning content. Initiatives such as the Secondary Education Quality Improvement Project (SEQUIP) and the Universal Communications Service Access Fund (UCSAF) have also contributed to expanding ICT-related opportunities in education. Nevertheless, the existence of national programmes does not necessarily mean that all teachers have adequate access to functional ICT facilities at their schools. Effective classroom integration may still be constrained by insufficient equipment, unreliable internet connectivity, and limited technical support. Consequently, investigating teachers' access to ICT facilities is important for determining whether the resources provided

through national initiatives are adequately available to support teaching and students' academic achievement.

In Nyamagana District, Mwanza Region, concerns remain regarding the availability and effective accessibility of ICT facilities in public secondary schools despite national efforts to promote technology-supported education. Ndume et al. (2021) identify challenges associated with ICT integration in the district, while Msambwa and Daniel (2024) highlight difficulties related to internet connectivity and the availability of technological infrastructure. Vumilia (2020) also points to gaps in teachers' practical ICT competence and ongoing technical support. These challenges may limit teachers' ability to prepare interactive lessons, access digital instructional materials, and provide students with technology-supported learning experiences. Although previous studies have examined ICT integration and its associated challenges, further evidence is needed to establish how teachers' access to ICT facilities influences students' academic success specifically in public secondary schools in Nyamagana District. Therefore, the present study examines the influence of teachers' access to ICT facilities on students' academic success in public secondary schools in Nyamagana District, Tanzania.

Theoretical Review

This paper was guided by the Technological Pedagogical Content Knowledge (TPACK) theory which was developed by Mishra and Koehler in 2006, building on Shulman's (1986) concept of Pedagogical Content Knowledge (PCK). The theory assumes that effective technology integration in teaching requires the interaction of three main knowledge domains: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). It further assumes that teachers should select and use technological tools according to the subject content, teaching methods, and students' learning needs. The strength of the theory is that it provides a comprehensive framework for understanding how technology can be integrated into teaching to improve students' learning experiences and academic outcomes (Goradia, 2018). However, its weakness is that it provides limited practical guidance on how teachers can combine the three knowledge domains in specific classroom situations, making its application dependent on teachers' skills and the availability of appropriate resources.

The TPACK theory was relevant to this study because it provided a theoretical foundation for examining the influence of teachers' access to ICT facilities on students' academic success in public secondary schools in Nyamagana District, Tanzania. The theory suggests that access to facilities such as computers, projectors, tablets, internet connectivity, and digital learning materials creates opportunities for technology-supported teaching, but their educational value depends on how teachers integrate them with subject content and appropriate teaching methods. For example, science teachers can use digital simulations to explain complex concepts, while mathematics teachers can use interactive software to demonstrate mathematical problems. Therefore, the theory helped explain how teachers' access to ICT facilities, together with their ability to use these resources appropriately, could support students' understanding, engagement, and academic success (Mishra & Koehler, 2006; Goradia, 2018).

Literature Review

Gray and Lewis (2021) established that teachers' accessibility to ICT facilities supported technology integration, student engagement, and academic performance in public schools in the United States. Similarly, Hayes and Allsop (2023) found that teachers' access to ICT facilities enhanced lesson delivery, students' understanding, and academic performance. Pareek et al. (2025) also revealed that teachers' access to ICT resources strengthened their digital competence and improved students' engagement and academic achievement. However, these studies did not sufficiently examine educational equity, stakeholder involvement, or how teachers' technological knowledge interacts with pedagogy and subject content to improve

academic success. Furthermore, some studies relied on single-method approaches, limiting the depth of understanding of teachers' and students' experiences.

Agyeman and Osei (2022) found that teachers with greater access to ICT facilities were more effective in integrating technology into classroom instruction, which improved students' engagement and achievement in public secondary schools in Ghana. However, their study relied exclusively on quantitative survey data, limiting its ability to explain the experiences underlying the reported findings. Okoli and Osuji (2020), who examined ICT accessibility in Nigerian public secondary schools, similarly established that access to ICT facilities supported student engagement and academic achievement. Nevertheless, the geographical context limited the direct applicability of their findings to Tanzania, where educational infrastructure, socioeconomic conditions, and policy implementation may differ. These limitations indicated the need for context-specific research incorporating both quantitative and qualitative evidence. In Tanzania, Warioba et al. (2021) found that ICT facilities positively influenced student engagement and academic achievement in community secondary schools in Serengeti District, although access remained uneven, particularly in schools with limited infrastructure. Despite providing relevant local evidence, the study focused mainly on infrastructural challenges and general ICT adoption without adequately examining the relationship between teachers' technological knowledge, pedagogical practices, and subject content. This theoretical gap suggested the need to investigate how teachers' accessibility to ICT facilities, combined with their ability to integrate technology into subject-specific instruction, contributed to students' academic success in public secondary schools.

Nabwire et al. (2025) established that improved ICT accessibility was associated with higher student engagement and better academic outcomes in Kenyan public secondary schools. However, the study emphasized infrastructural access and quantitative performance measures without sufficiently examining the role of the Technological Pedagogical Content Knowledge (TPACK) theory in explaining effective ICT integration. Therefore, the current study addressed the identified geographical, methodological, and theoretical gaps by examining teachers' accessibility to ICT facilities and students' academic success in public secondary schools in Nyamagana District, Tanzania. Using a mixed-methods approach and a convergent parallel design, the study combined quantitative and qualitative evidence, guided by TPACK theory, to provide a context-specific understanding of ICT accessibility and its contribution to students' academic success.

RESEARCH METHOD

The study adopted a mixed-methods research approach using a convergent parallel design, in which quantitative and qualitative data were collected concurrently, analysed independently, and integrated during interpretation to provide a comprehensive understanding of the influence of teachers' ICT usage on students' academic success in public secondary schools in Nyamagana District, Tanzania. The target population comprised 53,463 respondents, including 52,203 students, 1,210 teachers, 31 heads of schools, 18 Ward Education Officers (WEOs), and one District Secondary Education Officer (DSEO). A sample of 201 respondents was selected, comprising 100 students, 92 teachers, five heads of schools, three WEOs, and one DSEO. Stratified and simple random sampling techniques were used to select teachers, students, and schools, while purposive sampling was used to select education officers and heads of schools. Data were collected through questionnaires administered to teachers and students, semi-structured interviews with education officers and heads of schools, and direct observation of ICT facilities and classroom practices. Validity was established through expert assessment of face and content validity, while reliability was assessed using Cronbach's alpha, yielding coefficients of 0.926 for students' questionnaires and 0.878 for teachers' questionnaires. Qualitative trustworthiness was ensured through credibility, transferability, dependability, and confirmability, while piloting involving 10 teachers and 10 students at a school excluded from

the main sample helped refine the research instruments. Quantitative data were analysed using descriptive statistics, including frequencies and percentages, with SPSS version 26, while qualitative data were analysed thematically through transcription, coding, categorization, and theme development. The findings were integrated by comparing quantitative results with qualitative themes to identify convergence, divergence, and complementarity. Data collection followed the required authorization procedures, and ethical principles, including informed consent, voluntary participation, anonymity, confidentiality, privacy, and proper acknowledgement of sources, were observed throughout the study.

FINDINGS AND DISCUSSION

The paper sought to investigate how teachers' accessibility of ICT facilities influences students' academic success in public secondary schools in Nyamagana District. Data were collected from two groups of respondents: students and teachers through questionnaires and interviews with the DEO, WEOs, and heads of schools. This objective has two aspects: teachers' responses on the accessibility of ICT facilities for students' academic success and students' responses.

Teachers' Response Concerning Teachers' Access to ICT Facilities on Students' Academic Success

This is the first section which presents teachers' responses on their access to ICT facilities by indicating their level of agreement: strongly disagree, disagree, neutral, agree, and strongly agree. The findings are presented in Table 1.

Table 1
Teachers' Responses on the Accessibility of ICT Facilities and Students' Academic Success (n = 92)

Statements	SD F (%)	D F (%)	N F (%)	A F (%)	SA F (%)
i. The availability of ICT facilities in the school is sufficient to meet the academic needs of students.	17 (18.5)	8 (8.7)	23 (25.0)	31 (33.7)	13 (14.1)
ii. Students have easy access to ICT resources (e.g., computers, internet) for their academic work.	11 (12.0)	16 (17.4)	7 (7.6)	42 (45.7)	16 (17.4)
iii. The use of ICT facilities in the classroom has a positive impact on students' academic performance.	8 (8.7)	12 (13.0)	13 (14.1)	31 (33.7)	28 (30.4)
iv. I regularly encourage students to use ICT tools to support their learning and complete assignments.	12 (13.0)	14 (15.2)	15 (16.3)	34 (37.0)	17 (18.5)
v. The school provides enough support for both teachers and students to use ICT in the learning process effectively.	14 (15.2)	17 (18.5)	11 (12.0)	35 (38.0)	15 (16.3)
vi. The integration of ICT facilities into lessons enhances students' understanding of complex academic topics.	7 (7.6)	10 (10.9)	12 (13.0)	40 (43.5)	23 (25.0)

Source: Field Data (2026)

Table 1 presents teachers' responses regarding the accessibility of ICT facilities and their contribution to students' academic success in public secondary schools. The findings indicate a generally positive but mixed perception among teachers, with the majority agreeing or strongly agreeing across most statements. At the same time, a noteworthy proportion expressed disagreement or neutrality, particularly regarding the sufficiency and institutional support for ICT access.

Availability of ICT Facilities is Sufficient to Meet Students' Academic Needs

The findings indicate that 44 teachers (47.8%) agreed or strongly agreed that the availability of ICT facilities in their schools is sufficient to meet students' academic needs, with 13 (14.1%) strongly agreeing and 31 (33.7%) agreeing. However, 25 teachers (27.2%) disagreed or strongly disagreed, and 23 (25.0%) remained neutral. The relatively divided response to this statement is noteworthy. It reveals that while some schools in Nyamagana District have made meaningful progress in ICT provisioning, the overall availability of ICT facilities remains inadequate to meet students' academic needs across all schools fully. During interviews, one respondent observed:

> *ICT facilities in most of our schools remain grossly inadequate. We have very few computers relative to student numbers, and internet connectivity is unstable. Students cannot fully benefit academically when access is so limited (Interviewee A1, May 2026)*

This finding indicates that while ICT availability has made some progress, the existing infrastructure falls short of what is required to consistently support students' academic success across all public secondary schools in Nyamagana District. Observation results supported this finding by revealing that some schools had limited ICT facilities, with inadequate numbers of computers, unreliable internet connectivity, and insufficient digital learning resources to serve the growing number of students. In some observed schools, ICT laboratories were available but could not fully support regular practical sessions due to equipment shortages, maintenance challenges, and limited access time for students. These observations indicate that the presence of ICT facilities alone does not guarantee effective utilization unless schools have adequate, functional, and accessible technological resources. For school leaders and policymakers, this underscores the urgent need for targeted investment in ICT infrastructure as a foundational prerequisite for technology-enhanced learning.

The finding is consistent with Warioba et al. (2021), who found that while ICT facilities positively influenced student engagement and achievement in community secondary schools in Tanzania, accessibility remained uneven, particularly in schools with limited infrastructure. These findings are grounded in TPACK theory, which emphasizes that effective technology integration requires not only technological knowledge but also the physical availability of technological tools; without adequate ICT infrastructure, even knowledgeable and motivated teachers cannot meaningfully integrate technology into instruction to enhance student learning outcomes (Habiyaremye et al., 2023). Schools should therefore prioritize the expansion and equitable distribution of ICT facilities as a non-negotiable foundation for improving students' academic success. This demonstrated that improving students' academic success through ICT integration requires schools and policymakers to prioritize adequate, equitable, and sustainable investment in ICT infrastructure to enable effective technology-supported teaching and learning.

Students Have Easy Access to ICT Resources for their Academic Work

For the second statement, 58 teachers (63.1%) agreed or strongly agreed that students have easy access to ICT resources for their academic work, with 16 (17.4%) strongly agreeing and 42 (45.7%) agreeing. However, 27 teachers (29.4%) disagreed or strongly disagreed, and 7 (7.6%) remained neutral. The moderately positive but significantly divided response on this statement reveals that student access to ICT resources, while present in some schools, is far from universal or equitable in Nyamagana District's public secondary schools. The high proportion of disagreement, nearly a third of teacher respondents, signals that a substantial number of schools in the district do not provide students with reliable or easy access to computers and internet services for academic purposes. During interviews, one respondent noted:

> *Students struggle to access computers regularly. We have one computer lab shared by over six hundred students. Scheduling is difficult, and many students go weeks without meaningful ICT access, which directly undermines their academic engagement and performance (Interviewee B1, May 2026*)

This finding implies that limited student access to ICT resources constitutes a serious and ongoing barrier to academic success in public secondary schools in Nyamagana District. For education managers and district planners, it highlights the need for structured ICT access schedules, investment in additional computer laboratories, and exploration of alternative digital access models such as tablet programmes and mobile learning initiatives. This is supported by Nabwire et al. (2025), who found that schools with better ICT accessibility recorded higher levels of student engagement and improved academic outcomes in Kenyan public secondary schools, indicating that the quantity and reliability of student access to ICT resources are directly linked to academic performance These findings align with TPACK theory, which posits that the integration of technological knowledge with pedagogical and content knowledge is only possible when students have reliable access to the technological tools that mediate learning; without such access, the benefits of teachers' TPACK competence cannot be fully realized in the classroom (Tschönhens et al., 2024). Schools should therefore develop systematic ICT access protocols that ensure every student has adequate and regular opportunities to engage with digital learning resources. The finding highlights that equitable and consistent access to ICT resources is crucial for enabling effective technology-supported learning and improving students' academic success in public secondary schools.

Use of ICT Facilities in the Classroom has a Positive Impact on Students' Academic Performance

Regarding the third statement, 59 teachers (64.1%) agreed or strongly agreed that the use of ICT facilities in the classroom has a positive impact on students' academic performance, with 28 (30.4%) strongly agreeing and 31 (33.7%) agreeing. Twenty teachers (21.7%) disagreed or strongly disagreed, and 13 (14.1%) remained neutral. The majority agreement on this statement confirms that teachers who have experienced the use of ICT in their classrooms perceive it as genuinely beneficial for students' academic outcomes. The presence of some disagreement, however, suggests that for some teachers, the current conditions of ICT access and integration are insufficient to produce observable academic improvement, either because the facilities available are inadequate or because the pedagogical integration of ICT remains inconsistent. During interviews, one respondent observed:

> *When we do manage to use the computer lab or projectors effectively in our lessons, the difference in student understanding is immediate and visible. Digital tools make abstract content concrete and engaging, and test scores improve noticeably after technology-supported lessons (Interviewee A2, May 2026)*

This shows that ICT use in the classroom has demonstrable positive effects on students' academic performance when facilities are adequate and integration is intentional and pedagogically informed. However, observation results revealed that classroom ICT integration was constrained by insufficient ICT tools, including inadequate numbers of computers, projectors, and other digital learning resources. In some schools, the limited availability of functional ICT equipment reduced teachers' ability to regularly incorporate technology into lessons and limited students' exposure to ICT-supported learning activities. For teachers and school administrators, this underscores the importance of not merely providing ICT access but ensuring that technology is actively and regularly incorporated into classroom instruction as a deliberate strategy for enhancing academic outcomes. This is supported by Agyeman and Osei (2022), who found in Ghana that teachers with greater access to ICT facilities were more

effective in integrating technology into classroom instruction, which positively influenced students' engagement, achievement, and academic success.

These findings are consistent with TPACK theory, which holds that the academic impact of ICT use in the classroom is maximized when teachers integrate technological tools in ways that are coherently aligned with their subject content and pedagogical strategies, creating learning experiences that neither content alone nor technology alone could produce (Goradia, 2018). Schools should therefore invest in both ICT infrastructure and teacher professional development to ensure that technology use in classrooms translates into measurable improvements in students' academic performance. The finding demonstrates that effective ICT integration in classroom instruction requires both adequate technological resources and teachers' pedagogical competence to enhance students' academic performance.

Teachers Regularly Encourage Students to use ICT Tools to Support Learning and Complete Assignments

The fourth statement received a moderately positive response, with 51 teachers (55.5%) agreeing or strongly agreeing that they regularly encourage students to use ICT tools to support their learning and complete assignments, with 17 (18.5%) strongly agreeing and 34 (37.0%) agreeing. However, 26 teachers (28.2%) disagreed or strongly disagreed, and 15 (16.3%) remained neutral. The considerable proportion of disagreement and neutrality on this statement is significant. It suggests that a substantial number of teachers do not consistently encourage ICT use among their students, which may reflect limited confidence in ICT tools, inadequate training, or the recognition that students lack the access necessary to respond meaningfully to such encouragement. During interviews, one respondent explained:

> *I want to encourage my students to use ICT, but I cannot in good conscience tell them to research online when most cannot afford data, and the school computers are always occupied. Encouragement without access creates frustration rather than academic benefit (Interviewee W1, May 2026)*

This suggests that teachers' willingness to encourage ICT use is significantly constrained by the structural realities of ICT accessibility in their schools and communities. For education planners and school leaders, it highlights the need to address both the supply side of ICT access and the demand side of teacher confidence and ICT integration capacity simultaneously. Okoli and Osuji (2020) found in Nigeria that teachers with greater access to ICT facilities were more effective in integrating technology into classroom instruction, which positively influenced students' engagement and achievement, indicating that teacher encouragement of ICT use is closely linked to the accessibility of the tools themselves.

These findings are grounded in TPACK theory, which recognizes that selecting and applying a technological tool without considering its pedagogical purpose or its accessibility to learners will not improve learning outcomes; teacher encouragement must be backed by genuine student access to be academically meaningful (Habiyaremye et al., 2023). Schools should therefore develop clear policies that link teacher encouragement of ICT use to verifiable student access to the relevant tools. The finding suggests that promoting teachers' encouragement of ICT use requires improving ICT accessibility while strengthening teachers' capacity to integrate technology effectively into teaching and learning processes.

Integration of ICT into Lessons Enhances Students' Understanding of Complex Academic Topics

For the sixth and final statement, 63 teachers (68.5%) agreed or strongly agreed that integrating ICT facilities into lessons enhances students' understanding of complex academic topics, with 23 (25.0%) strongly agreeing and 40 (43.5%) agreeing. Seventeen teachers (18.5%) disagreed or strongly disagreed, and 12 (13.0%) remained neutral. The majority agreement on this statement provides compelling evidence that teachers who integrate ICT into their lessons

observe genuine improvements in students' comprehension of difficult academic content. During interviews, one respondent reflected:

> *Using a projector to display visual diagrams and video demonstrations for science topics dramatically improved my students' conceptual understanding. What previously required multiple lessons to explain became clear in a single ICT-supported session (Interviewee D1, May 2026)*

This quote shows that integrating ICT into subject-specific instruction has a particularly powerful effect on students' ability to understand complex academic content, suggesting that ICT is not merely a motivational tool but a genuine cognitive aid that deepens subject comprehension. However, observation results revealed that the use of digital tools during lessons was limited in some schools due to inadequate ICT facilities, insufficient devices, and limited access to digital teaching resources. As a result, teachers had fewer opportunities to apply ICT-based instructional approaches to simplify complex concepts and enhance students' understanding of difficult subject content.

This observation is consistent with Warioba et al. (2021), who noted that inadequate ICT infrastructure and limited accessibility hinder effective technology integration in Tanzanian secondary schools. For curriculum planners and subject specialists, it underscores the importance of designing ICT integration strategies that are deliberately targeted at the most conceptually demanding elements of each subject syllabus. This is supported by Pareek et al. (2025), who found that teachers with better ICT access and competence enhanced students' engagement and academic achievement in India by making complex content more accessible through digital tools.

These findings are grounded in TPACK theory, which holds that the most effective technology integration occurs when teachers select technological tools that are specifically matched to both the pedagogical strategy and the complexity of the content being taught, creating a synergy of technology, pedagogy, and content that produces deeper and more durable student understanding than any single element could achieve alone (Tschönhens et al., 2024). Schools should therefore train teachers to deploy ICT tools in ways that explicitly enhance conceptual understanding of complex academic topics as a core strategy for improving students' academic success.

Students' Response Concerning Teachers' Access to ICT Facilities on Students' Academic Success

This is the second section which presents students' responses on teachers' access to ICT facilities by indicating their level of agreement: strongly disagree, disagree, neutral, agree, and strongly agree on teachers' access to ICT facilities and students' academic success. The findings are presented in Table 2.

Table 2

Students' Responses on ICT Accessibility and Academic Success (n = 100)

Statements	SD F (%)	D F (%)	N F (%)	A F (%)	SA F (%)
i. The school provides enough ICT resources (e.g., computers, internet) for all students to use for their academic work.	18 (18.0)	6 (6.0)	6 (6.0)	51 (51.0)	19 (19.0)
ii. I find it easy to access ICT facilities whenever I need them for my studies.	16 (16.0)	13 (13.0)	10 (10.0)	35 (35.0)	26 (26.0)
iii. Using ICT facilities (e.g., computers, internet) has significantly improved my understanding of academic subjects.	10 (10.0)	14 (14.0)	10 (10.0)	44 (44.0)	22 (22.0)

iv.	Teachers frequently integrate ICT tools (e.g., online resources, presentations) into lessons to enhance learning.	7 (7.0)	9 (9.0)	18 (18.0)	43 (43.0)	23 (23.0)
v.	I feel confident in my ability to use ICT tools effectively to complete academic tasks.	8 (8.0)	12 (12.0)	8 (8.0)	45 (45.0)	27 (27.0)
vi.	Access to ICT facilities has positively influenced my academic performance and success in exams.	8 (8.0)	10 (10.0)	6 (6.0)	34 (34.0)	42 (42.0)

Source: Field Data (2026)

Table 2 presents students' responses regarding the accessibility of ICT facilities and their contribution to academic success.

The School Provides Enough ICT Resources for All Students

The findings indicate that 70 students (70.0%) agreed or strongly agreed that the school provides enough ICT resources for all students to use for their academic work, with 19 (19.0%) strongly agreeing and 51 (51.0%) agreeing. However, 24 students (24.0%) disagreed or strongly disagreed, and 6 (6.0%) remained neutral. While the majority response is positive, nearly a quarter of students reporting insufficient ICT provision signals meaningful gaps in resource availability that must not be overlooked. During interviews, one head of school observed:

> *Students' perceptions of ICT availability differ depending on which school they attend. In schools with more computers and reliable internet, students feel well-resourced, but in schools with limited equipment, the same question reveals serious gaps that constrain academic engagement (Interviewee A2, May 2026)*

This finding indicates that ICT resource provision in Nyamagana District's public secondary schools remains unequal, creating differential academic opportunities for students depending on their school placement. For district education authorities, it highlights the need for equity-focused ICT provisioning policies that specifically target under-resourced schools. Nabwire et al. (2025) found that schools with better ICT accessibility recorded higher levels of student engagement and improved academic outcomes, confirming that the quantity and quality of ICT resources available to students are directly linked to their academic success. These findings are consistent with TPACK theory, which recognizes that effective technology integration in support of student learning is contingent on the availability of appropriate technological tools; without adequate and equitably distributed ICT resources, the potential of technology to enhance students' academic success cannot be fully realized (Goradia, 2018). The finding suggests that promoting teachers' encouragement of ICT use requires improving ICT accessibility while strengthening teachers' capacity to integrate technology effectively into teaching and learning processes.

Using ICT Facilities has Significantly Improved Understanding of Academic Subjects

Regarding the third statement, 66 students (66.0%) agreed or strongly agreed that using ICT facilities has significantly improved their understanding of academic subjects, with 22 (22.0%) strongly agreeing and 44 (44.0%) agreeing. However, 24 students (24.0%) disagreed or strongly disagreed, and 10 (10.0%) remained neutral. The majority agreement among students on this statement is a direct affirmation, from the learners themselves, that ICT use produces genuine and meaningful improvements in academic understanding. During interviews, one head of school explained:

> *Students who regularly use ICT for their studies demonstrate noticeably deeper understanding of academic content. They access broader information, visualize complex ideas, and engage more actively with learning, which directly translates into stronger academic performance. (Interviewee A2, May 2026)*

This finding implies that ICT use is a genuinely powerful lever for improving students' academic understanding, but its benefits are experienced unevenly depending on the quality and consistency of access. For curriculum developers and school leaders, it underscores the importance of integrating ICT use into structured academic activities rather than leaving it to individual student initiative, ensuring that all students experience its cognitive benefits equitably. Pareek et al. (2025) found that ICT accessibility enhanced students' engagement and academic achievement, with stronger effects among students who had more consistent and guided access to digital tools. These findings are grounded in TPACK theory, which holds that technology integration enhances learning most powerfully when it is contextually appropriate, pedagogically informed, and consistently accessible to all learners, enabling the synergistic interaction of technological, pedagogical, and content knowledge to improve academic outcomes (Habiyaremye et al., 2023). The finding highlights that maximizing the academic benefits of ICT requires structured, equitable, and consistent access to digital resources alongside purposeful integration into teaching and learning activities.

Teachers Frequently Integrate ICT Tools into Lessons to Enhance Learning

The fourth statement received a positive response, with 66 students (66.0%) agreeing or strongly agreeing that teachers frequently integrate ICT tools such as online resources and presentations into lessons to enhance learning, with 23 (23.0%) strongly agreeing and 43 (43.0%) agreeing. Sixteen students (16.0%) disagreed or strongly disagreed, and 18 (18.0%) remained neutral. The majority agreement on this statement provides student-level confirmation that ICT integration by teachers is a recognized and meaningful element of the learning experience in public secondary schools in Nyamagana District. During interviews, one respondent observed:

> *When teachers use presentations and online resources during lessons, students are far more attentive and grasp content more quickly. However, not all teachers do this regularly, and the inconsistency means students' access to ICT-enhanced instruction varies greatly depending on the subject. (Interviewee W3, May 2026)*

This explains that while teacher-led ICT integration is occurring and is positively received by students, its impact on academic success is constrained by its inconsistency across the teaching staff. Observation results revealed that although some teachers incorporated ICT resources during teaching and learning, the practice was not consistent across all classrooms due to variations in teachers' ICT skills, availability of ICT facilities, and access to digital teaching resources. In some observed lessons, traditional teaching approaches were still dominant, limiting the regular use of ICT-supported instruction. For school leaders and academic supervisors, this highlights the importance of establishing institutional expectations and supportive policies that encourage all teachers to regularly and meaningfully incorporate ICT into their instructional practice. Hayes and Allsop (2023) found that teachers who were more consistent in integrating ICT into lessons produced significantly better student learning outcomes, confirming that frequency and intentionality of ICT integration are as important as the tools themselves.

These findings align with TPACK theory, which emphasizes that effective technology integration requires teachers to continuously and adaptively apply their knowledge of technology, pedagogy, and content together, and that this integration must be sustained and systematic rather than sporadic to produce consistent improvements in students' academic success (Goradia, 2018). The finding indicates that consistent and purposeful teacher-led ICT integration is essential for translating available digital resources into improved students' academic success, requiring continuous teacher support and institutional commitment.

Students Feel Confident in Their Ability to use ICT Tools Effectively

The fifth statement received a strongly positive response, with 72 students (72.0%) agreeing or strongly agreeing that they feel confident in their ability to use ICT tools effectively to complete academic tasks, with 27 (27.0%) strongly agreeing and 45 (45.0%) agreeing. Only 20 students (20.0%) disagreed or strongly disagreed, and 8 (8.0%) remained neutral. The high level of student confidence in ICT use is an encouraging finding, as digital self-efficacy is a critical determinant of whether students will actively and productively engage with ICT tools for academic purposes. During interviews, one head of school commented:

> *Students today are generally quite capable with technology when allowed to use it. Their digital confidence is an enormous asset that schools must harness more deliberately to drive academic improvement rather than leaving that potential untapped. (Interviewee A4, May 2026)*

This finding reveals that student ICT confidence is a latent academic resource that schools in Nyamagana District are not yet fully leveraging. For teachers and school managers, it suggests that strategies designed to channel students' existing digital confidence into structured, academically productive ICT activities could yield significant dividends in academic performance without requiring additional infrastructure investment. Agyeman and Osei (2022) found that students in schools with greater ICT access demonstrated higher digital confidence and academic engagement, indicating that confidence and access are mutually reinforcing. These findings are consistent with TPACK theory, which posits that student digital confidence, as a dimension of technological knowledge, interacts with pedagogical and content-specific support from teachers to create conditions for effective technology-enhanced learning and improved academic outcomes (Tschönhens et al., 2024). The finding suggests that strengthening students' ICT confidence through structured academic activities and teacher support can enhance technology-enabled learning and contribute to improved academic success.

Access to ICT Facilities has Positively Influenced Academic Performance and Exam Success

The sixth and final statement received the strongest positive response in the student questionnaire, with 76 students (76.0%) agreeing or strongly agreeing that access to ICT facilities has positively influenced their academic performance and exam success, with 42 (42.0%) strongly agreeing and 34 (34.0%) agreeing. Only 18 students (18.0%) disagreed or strongly disagreed, and 6 (6.0%) remained neutral. This provides the most direct and conclusive evidence from students' own perspective that ICT access contributes meaningfully and tangibly to their academic performance and examination outcomes. During interviews, one head of school offered a comprehensive reflection:

> *Students who consistently access and use ICT for academic preparation perform better in examinations. They have exposure to broader content, practice with past papers online, and develop skills that examination questions increasingly demand. ICT access is no longer optional for competitive academic success. (Interviewee A5, May 2026)*

This indicates that ICT access is not merely a supplementary convenience but a substantive contributor to students' academic performance and examination success in public secondary schools in Nyamagana District. Gray and Lewis (2021) found that teachers with greater access to ICT facilities were more likely to integrate technology into lessons, which positively influenced students' performance and motivation. These findings are grounded in TPACK theory, which asserts that when teachers successfully integrate their technological, pedagogical, and content knowledge in ways that are contextually appropriate and accessible to students, the result is a qualitative transformation of the learning experience that leads to measurable improvements in students' academic performance and examination success (Habiyaremye et al., 2023). Schools should therefore commit to expanding ICT access,

strengthening teacher integration capacity, and building student digital confidence as interconnected and mutually reinforcing pillars of a comprehensive strategy. The finding demonstrates that expanding ICT access alongside strengthening teachers' integration skills and students' digital confidence is essential for improving academic performance and examination success in public secondary schools.

CONCLUSION

Based on the findings, the study concludes that teachers' accessibility to ICT facilities positively influenced students' academic success in public secondary schools in Nyamagana District, although access and utilization remained uneven across schools. Most teachers (64.1%) agreed or strongly agreed that using ICT facilities in the classroom improved students' academic performance, while 68.5% reported that ICT integration enhanced students' understanding of complex academic topics. Similarly, 76.0% of students agreed or strongly agreed that access to ICT facilities had positively influenced their academic performance and examination success, and 72.0% expressed confidence in using ICT tools to complete academic tasks. These findings suggest that ICT facilities support students' understanding of academic content, engagement in learning activities, and preparation for examinations. However, inadequate computers, unreliable internet connectivity, limited digital learning resources, and inconsistent integration of ICT into classroom instruction constrained the full realization of these benefits. The findings further indicated that the availability of ICT facilities alone was insufficient to guarantee improved academic outcomes without regular student access, appropriate teacher guidance, and effective integration of technology into teaching and learning. In relation to the Technological Pedagogical Content Knowledge (TPACK) theory, the study established that improving students' academic success through ICT requires the availability of appropriate technological resources and teachers' ability to integrate technology with suitable pedagogical approaches and subject content. Therefore, equitable ICT accessibility, effective utilization, and sustained institutional support are essential for strengthening students' academic success in public secondary schools.

Recommendation

Based on the conclusion, the study recommends that the Nyamagana District Council, through the District Education Office, should collaborate with the Ministry of Education, school management teams, and other education stakeholders to improve the availability, accessibility, and effective utilization of ICT facilities in public secondary schools. Specifically, the district education authorities should prioritize under-resourced schools when allocating computers, projectors, internet connectivity, and digital learning materials to ensure equitable access for all students. Head teachers should establish clear ICT access schedules that provide students with regular opportunities to use computer laboratories and other digital resources for academic research, assignments, revision, and examination preparation. Furthermore, school management teams should organize continuous professional development for teachers to strengthen their ICT skills and their ability to integrate technology meaningfully into classroom instruction. Teachers should also be encouraged to use ICT-supported activities that improve students' understanding of complex concepts and promote independent learning. Regular monitoring and maintenance of ICT facilities should be conducted to ensure that the available equipment remains functional and accessible. These measures would help address existing ICT accessibility gaps, promote consistent technology-supported teaching and learning, and improve students' academic performance and examination success in public secondary schools in Nyamagana District.

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