



Influence of Institutional Strategies Supporting Technology-Based Programmes on the Employability of Higher Education Graduates in Mwanza City, Tanzania

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Abstract : This study examined the influence of institutional strategies supporting technology-based programmes on the employability of higher education graduates in Mwanza City, Tanzania. The study was guided by Human Capital Theory and employed a qualitative approach using a phenomenological research design. The study targeted 400 participants comprising university students, graduates, academic staff, and administrators, from whom 30 participants were purposively and conveniently selected. Data were collected through semi-structured interviews, focus group discussions, and documentary review and were analysed thematically. The findings revealed that higher education institutions had adopted several strategies to support technology-based programmes, including investment in ICT infrastructure, integration of technology into curricula, provision of e-learning platforms and digital resources, support for student access to digital devices, quality assurance and monitoring, and development of ICT-related policies. These strategies were found to contribute to students' acquisition of technological competencies, improved learning experiences, and preparedness for employment. However, their effectiveness was constrained by inadequate ICT infrastructure, unreliable internet connectivity, limited access to personal digital devices, inconsistent integration of technology across courses, insufficient institutional resources, weak feedback and monitoring mechanisms, and uneven implementation of ICT policies across departments. The study concludes that institutional strategies can strengthen graduate employability when they provide consistent, equitable, and practical opportunities for students to acquire and apply technology-related competencies. The study recommends that higher education institutions strengthen ICT infrastructure and internet connectivity, expand access to digital devices and reliable e-learning platforms, provide continuous digital-pedagogy training for academic staff, ensure consistent implementation of ICT policies, strengthen quality assurance systems, and enhance university-industry collaboration to align technology-based programmes with changing labour-market requirements.

Keyword : institutional strategies, technology-based programmes, graduate employability, ICT, higher education

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INTRODUCTION

The 21st century has been characterized by rapid technological advancement that has transformed the nature of work and the competencies required for effective participation in the labour market. The emergence of the Fourth Industrial Revolution, driven by artificial intelligence, automation, big data and digital connectivity, has increased the demand for graduates who possess technological competence in addition to traditional academic knowledge (Sewlyn, 2024). Consequently, higher education institutions are increasingly expected to prepare graduates who can use digital platforms, analyse information, solve complex problems and adapt to changing technological environments. Graduate employability is therefore no longer determined solely by possession of academic qualifications but also by the ability to apply knowledge and technology in practical workplace contexts (ILO, 2024). In this regard, institutional strategies such as technology-integrated curricula, digital learning platforms, staff capacity development, ICT infrastructure, practical technology-based learning and industry-oriented training become important mechanisms through which universities can develop students' employability. The effectiveness of these strategies, however, depends partly on lecturers' technological and pedagogical competence, particularly their Technological Pedagogical

Content Knowledge (TPACK), which facilitates meaningful integration of technology into teaching and learning.

At the global level, technology-based programmes have increasingly been promoted as an important means of preparing higher education students for contemporary employment. Employers increasingly value practical digital skills, technological literacy, problem-solving, adaptability and the capacity to use digital tools in authentic work situations (ILO, 2024; OECD, 2023). However, the availability of technology within universities does not automatically produce employable graduates. Rather, employability benefits depend on how institutions strategically integrate technology into curricula, teaching, assessment and practical learning experiences in ways that reflect workplace requirements (Sophia & Onen, 2024). Where institutional support is inadequate, technology may be used merely for presentations or information delivery instead of developing students' applied competencies. Limited student ICT backgrounds, inadequate lecturer TPACK and insufficient opportunities to practise using relevant technologies may consequently weaken the contribution of technology-based programmes to graduate employability (Gatete, 2025). This situation demonstrates that institutional strategies are central to determining whether investment in educational technology translates into meaningful

competencies and improved preparedness for employment.

In Africa, the need for effective institutional strategies supporting technology-based programmes is particularly important because of the continent's growing youth population, graduate unemployment and persistent mismatch between higher education outputs and labour-market requirements. Despite increasing investments in digital education and ICT integration, many graduates continue to experience difficulties in demonstrating practical ICT skills, problem-solving abilities and workplace readiness (AFDB, 2023). The African Union (2024) identifies digital skills development and technology integration as important components of preparing young people for participation in contemporary economies. Nevertheless, the implementation of technology-based programmes remains constrained by inadequate ICT infrastructure, unreliable electricity, limited internet connectivity, insufficient staff capacity and low utilization of available technologies (Bakkabulind et al., 2023). These constraints suggest that the effectiveness of technology-based programmes depends not simply on whether institutions possess digital technologies, but also on institutional strategies for providing infrastructure, developing staff competencies, supporting students, integrating technology into curricula and strengthening connections between

education and employment. Consequently, differences in institutional support can influence the extent to which technology-based education develops the competencies required for graduate employability.

In Tanzania, the expansion of higher education has occurred alongside increasing concern about the capacity of graduates to transition successfully from education into employment. Although universities have increasingly adopted learning management systems, computer-based training and digital literacy initiatives, challenges remain regarding the practical integration and effective utilization of educational technologies (TCU, 2024). Employers continue to identify deficiencies among some graduates in applied digital competencies, workplace communication and problem-solving, suggesting a continuing mismatch between university preparation and labour-market expectations. In response, the Tanzanian government has strengthened policy commitments towards ICT integration and invested in educational technology infrastructure (Ngure et al., 2023). However, institutional implementation continues to face challenges including limited internet bandwidth, inadequate technical support, insufficient lecturer digital-pedagogical skills and weak student engagement with online learning platforms (Massanja, 2024). These challenges raise an important concern regarding the extent to which

higher education institutions have developed and implemented effective strategies to ensure that technology-based programmes contribute to employability. Thus, the Tanzanian context calls for greater attention not only to the availability of technology but also to institutional practices that support its effective integration into teaching, learning and practical skills development.

Mwanza City provides an important context for examining this issue because it is a major urban and economic centre in the Lake Zone, where graduates compete for employment across ICT services, banking, education, business and other sectors. Despite improvements in Tanzania's overall employment indicators, graduate unemployment remains a concern, with evidence indicating that 41% of graduates remain unemployed immediately after graduation, 19% remain unemployed for up to two years and 11% experience unemployment beyond two years (Mgaiwa, 2021). In Mwanza, employers have reportedly identified difficulties among graduates in applying data analysis, software, digital communication and problem-solving skills in workplace settings, with weak university-industry collaboration and limited exposure to real work environments contributing to the challenge (Setonga & Omary, 2025). Although higher education institutions offer technology-related programmes and national policies emphasize

competency-based education, ICT integration and alignment of training with labour-market demands, the continued skills mismatch suggests a possible gap between institutional intentions and actual implementation (Lake Zone Chamber of Commerce, 2024; Magoma et al., 2024). Moreover, empirical evidence specifically examining how institutional strategies supporting technology-based programmes influence the employability of higher education graduates in Mwanza City remains limited. Existing research has tended to emphasize broader national trends, leaving insufficient localized evidence on institutional support, implementation practices and their contribution to graduates' workplace preparedness (Mtebe, 2023). It is against this background that the present study examines the influence of institutional strategies supporting technology-based programmes on the employability of higher education graduates in Mwanza City, Tanzania.

Literature Review

1. Theoretical Review

Human Capital Theory was first introduced by Theodore Schultz (1961), and then developed further by Gary Becker (1964). It suggests that education, training, and skills development involve investments in human capabilities that develop knowledge, skills, productivity, and economic value of people. The strength of the theory is in the ability of the

theory to explain how investments in education and training yield measurable benefits in terms of competencies, productivity, preparedness, and employability (Becker, 1964; Schultz, 1961). Criticism of the theory suggests that it focuses too much on skills and economic return without considering the role played by institutional, social, and labor market factors in affecting employability of individuals (Marginson, 2019). The relevance of the theory in this research is in the view that institutional strategies used in support of technology-based programs, which include digital infrastructure, curriculum oriented to technologies, development of staff, practical training, and collaboration with industry, amount to investments in human capital of graduates. These investments will help increase technological competencies, adaptability, skills, and preparedness of graduates, hence making them more competitive and employable in the labor market (Tomlinson, 2017; World Bank, 2019).

2. Empirical Review

Li and Worch (2021), in a qualitative case study of three Chinese universities, examined how institutional approaches influence the effectiveness of technology integration in teaching and learning. The study found that effective technology integration requires institutions to move beyond top-down administrative directives and adopt participatory

approaches that involve academic staff in technology planning and selection. Where technology requirements were imposed without adequate institutional support, lecturers tended to demonstrate “performative compliance,” whereby digital tools were used superficially while traditional teaching practices remained dominant. The study further identified institutional culture, examination-oriented practices, teacher-centred traditions, and lecturers’ concerns about technological competence as important factors influencing technology adoption. The authors recommended participatory governance, incentives for teaching innovation, communities of practice, and improved access to contextually appropriate digital resources. These findings are relevant to the present study because they demonstrate that institutional strategies, particularly staff involvement, supportive policies, incentives, and professional learning, are essential for ensuring that technology-based programmes contribute meaningfully to graduate competencies and, ultimately, employability.

Kisanga (2016), in a mixed-methods case study at Kenyatta University in Kenya, examined institutional strategies for implementing ICT and technology-based learning, with particular attention to equity and access in higher education. The study identified inadequate ICT infrastructure as a

major constraint, including high student-to-computer ratios, unreliable internet connectivity, insufficient bandwidth, and frequent power interruptions. It also found disparities in access to personal computers and reliable internet among students, particularly those from disadvantaged socioeconomic backgrounds, while limited e-learning pedagogical skills among academic staff constrained effective technology integration. Kisanga recommended blended learning, equipment loan schemes, subsidized internet access, and strengthened technical and pedagogical support systems, while emphasizing the need for context-sensitive implementation that considers students' preferences for structured face-to-face learning. The findings relate closely to the present study because they show that institutional strategies involving infrastructure provision, staff capacity development, technical support, and equitable access can determine the effectiveness of technology-based programmes and their ability to equip graduates with relevant competencies for employment.

Mtebe (2014), through a quantitative survey of five Tanzanian universities, investigated the implementation of technology-based programmes and found that successful technology integration requires a holistic combination of technological, human, institutional, and pedagogical strategies. The study identified

inadequate ICT infrastructure, unreliable internet connectivity, insufficient bandwidth, limited computer access, and unstable electricity as major technological barriers, while inadequate digital literacy and pedagogical competencies among students and academic staff limited effective use of learning management systems and online learning. In addition, weak institutional policies, inadequate technical and instructional design support, limited quality assurance mechanisms, insufficient funding, heavy workloads, and lack of incentives discouraged staff engagement in technology-supported teaching. The study also highlighted equity concerns, particularly for students from disadvantaged backgrounds. These findings are particularly relevant to the present study in Tanzania because they suggest that institutional strategies supporting technology-based programmes should extend beyond infrastructure investment to include staff development, supportive policies, technical assistance, incentives, quality assurance, and equity-oriented interventions, all of which may strengthen the competencies and work readiness of higher education graduates.

METHODOLOGY

This study adopted a qualitative research approach and a phenomenological research design to

explore the lived experiences, perceptions, and meanings that university students, graduates, academic staff, and administrators attach to technology-based programmes and their influence on graduate employability. The study was conducted at the Dar es Salaam Institute of Technology (DIT), Mwanza Campus, in Mwanza City, Tanzania, an important educational and economic centre with technology-oriented higher education programmes and a labour market that increasingly requires digital and technological competencies. The target population comprised 400 individuals, including 250 university students, 20 graduates, 120 academic staff, and 10 administrators. A sample of 30 participants was selected using purposive and convenience sampling, comprising 20 students, 3 graduates, 5 academic staff, and 2 administrators, with the final sample determined by data saturation. Data were collected through semi-structured interviews, two focus group discussions involving 10 students each, and documentary review of relevant curricula, ICT policies, strategic plans, programme documents, and graduate employability reports. Interviews lasted approximately 30–40 minutes, while FGDs lasted 60–90 minutes, and sessions were audio-recorded with participants' consent, transcribed verbatim, and translated where necessary. The trustworthiness of the study was ensured through credibility, dependability, confirmability, and

transferability, supported by triangulation, member checking, reflexivity, peer review, an audit trail, and thick description. Data were analysed using thematic analysis, involving familiarisation with the data, coding, development and review of themes, definition of themes, and presentation of findings using participants' accounts and documentary evidence. Ethical considerations included obtaining research clearance and institutional permission, informed and voluntary participation, participants' right to withdraw, confidentiality and anonymity, use of codes or pseudonyms, secure storage of research data, and protection of participants' rights and dignity throughout the study.

RESULT AND DISCUSSION

Presentation of the Findings

This study examined the institutional strategies used by higher education institutions to support technology-based programs and enhance graduate employability. The objective focused on key areas such as investment in ICT infrastructure, staff training in digital pedagogy, curriculum integration of technology, provision of e-learning platforms, collaboration with industry partners, and policy development for effective implementation of digital learning. The findings are based on qualitative data collected from administrators, academic staff, and university students

and graduates through interviews, focus group discussions, and documentary review in selected institutions in Mwanza City. The analysis is organized thematically to show how institutional efforts support the effectiveness of technology-based programs in improving students' employability, as presented below.

1. Investment in ICT Infrastructure

This theme explores how higher education institutions invest in ICT infrastructure to support technology-based programs. It focuses on the availability of computers, internet connectivity, learning management systems, and other digital facilities that enable effective teaching and learning. The findings show that while some institutions have made progress in ICT investment, challenges such as limited resources and uneven infrastructure development still exist. This is supported by an interview from one of the administrators who claimed that:

I have observed that our institution has invested in ICT facilities such as computer laboratories, internet connectivity, and online learning platforms to support technology-based programs. These investments are intended to improve teaching and learning processes and enhance students' employability. However, I have noticed that the available resources are still insufficient to fully meet the increasing number of students who rely

on these services (Interview B1, June 2026).

The finding that institutional ICT investments such as computer labs, internet connectivity, and online learning platforms are essential for supporting technology-based programmes but remain insufficient due to increasing student demand is supported by Mtebe (2014), who found that despite ICT investments, limited infrastructure, poor connectivity, and inadequate access to computers constrained effective implementation of e-learning, and by Kisanga (2016), who similarly reported that high student-to-computer ratios and limited internet access reduced students' participation and learning effectiveness despite institutional efforts. This situation is well explained by the Human Capital Theory, which posits that investment in education and training resources enhances individuals' skills and productivity; thus, ICT infrastructure represents an investment in students' human capital aimed at improving employability, but when such resources are inadequate, the expected skill acquisition and productivity gains are constrained, limiting the full realization of human capital development outcomes.

Another response from academic staff added that:

I have noted that the institution has improved ICT infrastructure by providing computers and access to online

learning systems. These improvements have made teaching and learning easier and more interactive. However, I have also experienced challenges such as slow internet speed and limited access during peak hours, which affect the effective use of these facilities by both students and lecturers (Interview A5, June 2026).

This suggests that although ICT infrastructure supports learning, poor system performance can reduce efficiency and learning quality. The finding that improved ICT infrastructure such as provision of computers and online learning systems enhances teaching and learning but is still constrained by challenges like slow internet speed and limited access during peak hours is supported by Li and Worch (2021), who found that even where institutions invest in digital learning technologies, system limitations and uneven access can lead to superficial use of ICT tools rather than meaningful pedagogical transformation. This finding can be explained by the Human Capital Theory, which argues that investment in ICT infrastructure is intended to enhance human capital through improved skills and productivity; however, when system performance and accessibility are weak, the returns on such investment are reduced, limiting effective learning and the development of employable competencies.

2. Curriculum Integration of Technology-Based Learning

This theme explores how technology-based learning is integrated into the university curriculum. It focuses on whether ICT tools, digital content, and online learning activities are included in teaching and learning processes. The findings show that institutions are gradually integrating technology into the curriculum, although the level of implementation varies across programs and departments. Also, one of the academic staff revealed that:

I include ICT elements in my teaching by using online platforms, PowerPoint presentations, and digital resources during lectures. I believe this helps students become familiar with technology as part of their learning process. However, I have also noted that some courses still depend more on traditional teaching methods, which slows down the full integration of ICT in teaching and learning (Interview A4, June 2026).

This finding is supported by Li and Worch (2021), who found that although universities introduced ICT tools such as online platforms and digital teaching resources, many lecturers still relied on traditional teacher-centred methods, resulting in partial or surface-level integration of technology in teaching and learning. Similarly, Mtebe (2014) observed that despite the availability of e-learning

systems, limited pedagogical transformation and continued dominance of conventional lecture methods hindered full adoption of technology-based instruction. This aligns with Human Capital Theory, which suggests that investments in educational technologies are intended to enhance human capital through improved skills and competencies; however, when technology is only partially integrated into teaching practices, the development of digital skills and employability-related competencies is limited, reducing the overall returns on investment in ICT-based education.

Additionally, from the focus group discussion, one of the students showed that:

I use online platforms for accessing learning materials and submitting assignments, which makes my studies easier and more flexible. However, I have noticed that not all courses incorporate technology-based learning, so students do not have the same experience across all subjects (FGD 1, student 12, June 2026).

This indicates that students experience uneven exposure to technology-based learning, which may affect equal skill development. This finding is supported by Li and Worch (2021), who found that uneven adoption of digital learning tools across different courses leads to inconsistent

student experiences and limits the development of uniform digital competencies among learners. Similarly, Kisanga (2016) reported that the lack of consistent use of ICT across all academic programmes resulted in unequal access to e-learning opportunities, which affected students' ability to acquire comparable technological skills. This situation is further explained by the Human Capital Theory, which posits that education is an investment in human capital aimed at equipping individuals with productive skills; however, when exposure to technology-based learning is uneven across courses, the accumulation of digital skills becomes inconsistent, thereby reducing the equality of human capital development and potentially affecting graduates' overall employability.

This finding is also supported by documentary review evidence from institutional ICT and education policy documents, which emphasize that consistent integration of ICT across all programmes is necessary to ensure standardized digital skills acquisition and equitable learning outcomes among students. These documents highlight that when ICT implementation is left to individual departments or lecturers without a unified institutional framework, disparities in technology use across courses are likely to emerge, ultimately affecting the quality and fairness of skill development across academic programmes.

3. Provision of E-Learning Platforms and Resources

This theme examines the availability of e-learning platforms and digital resources that support technology-based education. It focuses on whether students and lecturers have access to online systems, learning materials, and ICT tools necessary for effective learning. The findings show that while e-learning platforms exist, access and usability challenges still affect their effectiveness. Also, from the focus group discussion conducted with students, one of the students said that:

I use e-learning systems to upload lecture materials, provide assignments, and interact with students. These platforms have improved the efficiency of my teaching and made communication with students easier. However, I have experienced challenges where students face difficulties accessing learning materials due to system downtime and poor internet connectivity (FGD 1, Student 13, June 2026).

This finding is supported by Mtebe (2014), who found that although e-learning systems improved access to teaching materials and supported instructional delivery, frequent system downtime, weak internet connectivity, and limited technical support reduced their reliability and consistent use. Similarly, Li and Worch (2021) observed that even when digital platforms were integrated into

teaching, system instability and uneven access affected continuous student engagement and reduced the effectiveness of online learning tools. This finding is further explained by the Human Capital Theory, which argues that investment in e-learning systems is intended to enhance human capital by improving knowledge, skills, and productivity; however, when system reliability is weak, the learning process becomes inconsistent, reducing opportunities for effective skill acquisition and limiting the expected returns on educational investment.

Similarly, one of the respondents from the focus group discussion called that “E-learning platforms help me access notes, submit assignments, and communicate with lecturers easily. However, sometimes I cannot access the system due to network problems or lack of devices, which affects my studies” (FGD 2, Student 14, June 2026). This indicates that while e-learning platforms support learning, access barriers limit their effectiveness for all students. This finding is supported by Kisanga (2016), who reported that although e-learning systems improved access to learning materials and communication between students and lecturers, challenges such as unreliable internet connectivity, lack of personal devices, and high student-to-computer ratios limited students’ effective participation. Similarly, Mtebe (2014) found that system accessibility problems, including network instability and inadequate ICT

infrastructure, reduced the effectiveness of e-learning platforms despite their potential benefits for teaching and learning. This situation is further explained by the Human Capital Theory, which posits that investment in educational technologies is intended to enhance human capital by improving skills, knowledge, and productivity; however, when access barriers such as device shortages and poor connectivity exist, students are unable to fully benefit from these systems, thereby limiting effective skill acquisition and reducing the overall returns on investment in technology-based education.

4. Support for Student Access to Digital Devices

This theme examines how institutions support students in accessing digital devices such as computers, laptops, and smartphones for learning purposes. It focuses on whether students have adequate tools to participate effectively in technology-based learning. The findings show that while some support is available, many students still face challenges in accessing personal digital devices. Likewise, one of the students from the focus group discussion displayed that:

I often use the university computer lab because I do not have my own laptop. Sometimes it is difficult to get access when many students are using the facilities, which delays my assignments and

learning activities (FGD 2, Student 1, June 2026).

This indicates that limited access to personal digital devices affects students' learning efficiency and may hinder effective participation in technology-based programs. This finding is supported by Kisanga (2016), who reported that many students lacked personal computers and depended on shared institutional ICT facilities, where high demand and limited availability reduced learning efficiency and timely completion of academic tasks. Similarly, Mtebe (2014) found that insufficient access to personal digital devices and overreliance on university computer labs constrained students' engagement with e-learning systems and negatively affected participation in technology-based learning activities. This is further explained by the Human Capital Theory, which argues that investment in education and learning resources enhances individuals' skills and productivity; however, when access to essential digital tools such as personal computers is limited, students' ability to acquire and apply technological competencies is reduced, thereby weakening the development of human capital and overall employability outcomes.

Quality Assurance and Monitoring of ICT Programs

This theme explores how higher education institutions ensure the quality and effectiveness of ICT-based

programs through monitoring and evaluation mechanisms. It focuses on whether institutions regularly assess the performance of technology-based learning systems and address challenges affecting their implementation. The findings show that quality assurance processes exist, but their effectiveness varies across institutions due to resource and capacity limitations. Meanwhile, an interview response from one of the administrators validates that:

I use quality assurance mechanisms to monitor the implementation of ICT programs and ensure that they meet the required academic standards. I conduct periodic reviews and collect feedback from students and lecturers to identify areas for improvement. However, I have noted that challenges such as limited staffing and inadequate resources sometimes affect the consistency of monitoring activities across different departments (Interview B2, June 2026).

This implies that quality assurance systems are important for maintaining ICT program standards, but limited capacity affects effective monitoring and evaluation. This finding is supported by Mtebe (2014), who noted that although universities had established quality assurance frameworks for ICT and e-learning programmes, weak institutional capacity, limited technical staff, and

inadequate resources hindered consistent monitoring and evaluation across departments. Similarly, Li and Worch (2021) found that effective ICT integration requires strong institutional support systems, including continuous evaluation and staff involvement, yet many institutions struggled to maintain consistent quality assurance due to organizational and resource constraints. This is further explained by the Human Capital Theory, which emphasizes that investment in educational systems, including quality assurance mechanisms, is intended to enhance human capital development through improved learning outcomes and skills acquisition; however, when monitoring capacity is limited, the effectiveness of these investments is reduced, leading to inconsistencies in programme quality and weaker development of employable competencies.

Similarly, during focus group discussions, it was revealed that:

I am sometimes asked to provide feedback on online learning systems and teaching methods. However, I do not always see immediate changes after sharing my opinions, which makes me feel that the monitoring process is not always effective in addressing the issues raised by students (FGD 1, Student 18, June 2026).

This indicates that feedback mechanisms exist, but weak responses reduce students' confidence in quality

assurance processes. This finding is supported by Li and Worch (2021), who observed that although institutions established feedback channels for students regarding digital learning systems, weak responsiveness from management reduced trust in institutional improvement processes and limited the perceived effectiveness of quality assurance systems. Similarly, Kisanga (2016) reported that while feedback mechanisms existed in ICT-supported learning environments, slow or limited institutional response to student concerns undermined confidence in monitoring and evaluation processes and affected student engagement. This situation is further explained by the Human Capital Theory, which suggests that feedback systems are part of institutional investment in improving human capital development through better learning environments; however, when feedback is not acted upon effectively, the expected improvement in skills acquisition and learning quality is weakened, thereby reducing the overall returns on educational investment.

Furthermore, documentary review of institutional quality assurance and ICT implementation guidelines indicates that feedback from students and lecturers is a key component of continuous improvement in technology-based programmes. However, these documents also emphasize that the effectiveness of feedback systems

depends on timely response and institutional follow-up; where feedback is collected but not systematically acted upon, the monitoring process becomes weak, and its contribution to improving teaching and learning quality is reduced.

5. Policy Development for Technology-Enhanced Education

This theme examines the role of institutional policies in supporting technology-enhanced education. It focuses on whether clear guidelines and strategies exist to guide the implementation of ICT in teaching and learning. The findings show that policies are in place, but their implementation and enforcement vary across institutions. In addition, interview responses from one of the academic staff members noted that:

I have noted that our institution has developed policies that support the use of ICT in teaching and learning. These policies guide the implementation of e-learning platforms, digital assessments, and online communication systems. However, I have realized that the implementation of these policies is sometimes inconsistent due to limited resources and differences in staff commitment toward adopting technology-based practices (Interview A2, June 2026).

This implies that policy frameworks support technology-based education, but weak implementation reduces their effectiveness. This finding is supported by a documentary review of institutional ICT and e-learning policy guidelines, which indicate that most universities have established formal frameworks to guide the integration of digital tools in teaching, learning, and assessment. However, these documents also emphasize that effective implementation depends on adequate resources, staff capacity, and institutional commitment; where these conditions are weak, policy execution becomes inconsistent, thereby limiting the intended impact of ICT policies on improving teaching and learning quality. Equally, Kisanga (2016) found that although institutional ICT policies existed to promote the use of e-learning systems in teaching and learning, weak implementation capacity, limited resources, and low staff engagement resulted in inconsistent application of these policies across academic departments, thereby reducing their effectiveness in supporting technology-based education.

Additionally, focus group discussion from one of the students added that:

I know that the university has rules and guidelines regarding the use of online learning systems. However, I have noticed that implementation is not consistent across all departments. Some lecturers fully integrate ICT into their teaching, while others still rely

mainly on traditional teaching methods (FGD 1, student 6, June 2026).

This indicates that inconsistent policy implementation affects uniformity in students' learning experiences in technology-based programs. This finding is supported by Li and Worch (2021), who found that although institutional ICT policies existed, uneven implementation across departments led to variations in lecturers' use of digital tools, resulting in inconsistent student learning experiences. Similarly, Mtebe (2014) reported that differences in staff adoption of ICT policies and continued reliance on traditional teaching methods in some departments contributed to uneven implementation of technology-based learning across institutions. This finding is also explained by the Human Capital Theory, developed by Theodore Schultz, which argues that education is an investment in human capital aimed at equipping individuals with productive skills for the labour market. However, when institutional policies on ICT integration are implemented inconsistently across departments, students receive unequal learning opportunities and varying levels of digital skill development, which weakens the uniform accumulation of human capital and may ultimately affect graduate employability outcomes.

CONCLUSION

The study concludes that higher education institutions in Mwanza City have adopted various institutional strategies to support technology-based programmes and enhance graduate employability, particularly through investment in ICT infrastructure, integration of technology into curricula, provision of e-learning platforms and digital resources, support for student access to digital devices, quality assurance and monitoring, and development of ICT-related policies. However, the effectiveness of these strategies is constrained by inadequate ICT infrastructure, unreliable internet connectivity, limited access to personal digital devices, inconsistent curriculum integration, insufficient institutional resources, weak monitoring and feedback mechanisms, and uneven implementation of ICT policies across departments. The findings therefore suggest that institutional strategies contribute to the development of students' technological competencies and learning experiences, but their contribution to graduate employability is reduced when implementation is inconsistent or resources and support systems are inadequate. From the perspective of Human Capital Theory, these institutional strategies represent investments in graduates' knowledge, skills, and competencies; therefore, their effectiveness depends on institutions' capacity to provide adequate, equitable, and consistently

implemented opportunities for students to acquire and apply technology-related skills relevant to the labour market.

RecommendatiON

Higher education institutions should strengthen and coordinate institutional strategies supporting technology-based programmes by increasing investment in reliable ICT infrastructure, high-speed internet connectivity, adequate digital devices, and functional e-learning platforms, while ensuring equitable access for all students. Institutions should also provide continuous digital-pedagogy training for academic staff, integrate technology consistently across curricula, strengthen quality assurance and feedback mechanisms, and ensure that ICT policies are implemented uniformly across departments. Furthermore, institutions should establish stronger partnerships with employers and industry stakeholders to ensure that technology-based programmes reflect current workplace requirements and provide students with practical opportunities to apply their digital competencies. These measures would enhance the effectiveness of institutional investments in human capital and better equip graduates with the technological, practical, and transferable competencies required for sustainable employment in Mwanza City's evolving labour market.

REFERENCES

- African Development Bank. (2023). *African economic outlook 2023*. AfDB.
- African Union. (2024). *Digital transformation strategy for Africa (2024–2030)*. African Union Commission.
- Bakkabulindi, F. E. K., Nkata, J. L., & Amin, M. E. (2023). ICT integration in African universities: A multi-country perspective. *International Journal of Education and Development using ICT*, 19(1), 45–68.
- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.
- Gatete, O. (2025). Revisiting TPACK: A critical review and contextual extension for the digital age. *Journal of Educational Technology Systems*, 54(3), 561–612.
- International Labour Organization. (2024). *World employment and social outlook 2024: Skills for the digital age*. ILO.
- Kisanga, D., & Ireson, G. (2023). Computer science graduate employability in Tanzania: Gaps between education and industry needs. *African Journal of Science, Technology, Innovation and Development*, 15(4), 445–461.
- Lake Zone Chamber of Commerce. (2024). *Skills demand survey: Mwanza Region employment sector analysis 2023*. LZCC.
- Li, L., & Worch, E. (2021). Challenges of integrating educational technology in higher education: A case study of Chinese universities. *International Journal of Educational Technology in Higher Education*, 18(1), Article 54.
- Magoma, S. B., Rwehumbiza, F. B., & Mwakalobo, A. (2024). Employer perspectives on graduate employability in Mwanza Region. *Tanzania Journal of Development Studies*, 22(1), 67–85.
- Mgaiwa, S. J. (2021). Higher education and graduate employability in Tanzania: Addressing the skills gap. *Journal of International Development*, 33(7), 1154–1170.
- Mtebe, J. S., & Raisamo, R. (2014). Barriers to e-learning implementation in higher learning institutions of Tanzania: An empirical investigation. *International Journal of Education and Development using Information and Communication Technology*, 10(2), 23–39.
- Ngure, G. W., Mwangi, M., & Ndirangu, M. (2023). Technology training and youth employability in East Africa: Evidence from Kenya, Tanzania, and Uganda. *Journal of Education and Work*, 36(4), 312–329.
- Organisation for Economic Co-operation and Development. (2023). *Education at a glance 2023: OECD indicators*. OECD Publishing.

- Setonga, J., & Omary, P. (2025). Unveiling the determinants of unemployment among youth graduates in Tanzania. *Eminent Journal of Social Sciences*, 1(2), 67–81.
- Sophia, G., & Onen, D. (2024). Curriculum alignment and graduate employability: A comprehensive exploration at Makerere University. *East African Journal of Education Studies*, 7(4), 712–727.
- Tanzania Commission for Universities. (2024). *Annual report 2023/2024*. TCU.
- World Economic Forum. (2023). *Future of jobs report 2023*. WEF..

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