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# Transformative Education in the Digital Age: Evaluating the Impact of Digital Literacy Training on Graduate Employability in Kenya

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**Abstract**
This study aims to investigate the role of training delivery mode in determining the effectiveness of digital literacy training and, consequently, the acquisition of digital competence among university students in Kenya. The rapid adoption of digital technology has changed skill requirements in the labour market, compelling educational institutions to equip individuals with digital competencies. The Technology Acceptance Model (TAM) formed the basis for the convergent mixed-methods approach used in this study. Quantitative data were collected using structured questionnaires from 384 randomly selected final-year students across six universities in Kenya, while qualitative data were collected through interviews with 20 university administrators and 15 human resource managers. Descriptive findings revealed that although 78.4 per cent of students had received formal training in digital technologies, they lacked advanced digital competencies. Moderation analysis showed that blended delivery significantly increased digital competence acquisition (interaction $\beta = 0.178$, $p = 0.024$) and improved employability through enhanced problem-solving skills and effective application of learned skills in the workplace. Qualitative findings indicated that blended learning was preferred because face-to-face interaction facilitated understanding of difficult concepts. The findings demonstrate that training delivery mode moderates the relationship between digital literacy training and competency development, with blended delivery producing better outcomes. The study recommends that universities adopt blended learning models for digital literacy training. It contributes to research by demonstrating that training effectiveness depends substantially on how training is delivered, with blended learning emerging as the strongest approach.

**Key terms:** Blended learning, digital competencies, digital literacy training, graduate employability, moderation analysis, training delivery mode.

## 1.0 INTRODUCTION

Graduate unemployment has been a recurrent problem in Kenya for many years, with the current rate at 35 per cent five years after university graduation (Kenya National Bureau of Statistics [KNBS], 2023). The issue highlights the significant gap between the competencies universities develop in their graduates and those the labour market expects. Digital competencies have been among the most affected by this mismatch due to the continuous advancement of technology, which has made digital literacy a necessity in the labour market rather than an addition to other qualifications (World Economic Forum, 2025). The coronavirus pandemic served as a catalyst, accelerating the digital transformation process from the expected 10 years to just months (International Labour Organisation [ILO], 2021).

The Kenyan government, for its part, has come up with several programs to tackle the problem, some of which are the Ajira Digital Program, which has trained over 1.5 million young people in digital skills, and the Jitume Program, which incorporates digital skills in the TVET curriculum (Ministry of ICT, 2022). Despite these extensive efforts, employer satisfaction with graduates' digital skills is shockingly low, according to estimates by the Federation of Kenya Employers (2023) which show that only 23 per cent of the employers are satisfied with the graduates' digital competence, especially concerning their data analysis skills (67% dissatisfaction), digital communication skills (58%), cyber security knowledge (49%) and cloud computing skills (41%).

This gap highlights an important but little-examined issue: not how digital literacy training can be delivered to students, but how it should be delivered to achieve maximum competency development and strong employability outcomes. In Kenya, three major delivery methods are used by universities to provide digital literacy education: fully online, face-to-face, and blended learning; however, there is a lack of empirical evidence regarding which method leads to better competency development and employability outcomes. According to the World Bank (2024), despite the wide range of digital skills training programs launched in Sub-Saharan Africa, "there is limited rigorous evidence on what works, for whom, and under what conditions," particularly the need for research into moderating factors. The same idea was expressed by the ILO (2024), which stated that the success of training programs depends heavily on their delivery methods, the quality of education, and the support system; however, most programs lack such examinations.

At the national level, the Kenya National Innovation Agency (2024) and the Commission for University Education (2022) have also recommended an empirical study of the effectiveness of digital literacy training, as such initiatives have been undertaken without evidence to support them.

The Technology Acceptance Model (TAM) offers a useful theoretical framework for examining how the mode of training delivery may influence the relationship between training and competency. According to Davis (1989), adoption of technology and competence development are dependent on two main elements: "perceived usefulness, which refers to 'the degree to which a person believes that using a particular system would enhance his or her job performance'" and "perceived ease of use which refers to 'the degree to which a person believes that using a particular system would be free of effort".

The delivery model itself could affect both perceptions because, in the case of blended and face-to-face models, the perception of ease of use could be enhanced thanks to direct assistance provided by

instructors and practical training, whereas, in the case of purely online courses, students could find themselves unable to cope with some complex notions. In this regard, research conducted by Chola and Wanami (2026) revealed that, despite all CBET policy requirements, 86.5 per cent of teachers in Kenya still adhere to a traditional lecture-based pedagogical model owing to a lack of resources and limited capacity among trainers. Yet, in the case of adoption of blended and work-integrated learning, the results were higher (80.3%) than those in less resourceful institutions (73.97%).

Musuva (2026) found that Kenyan graduates with high levels of digital literacy were 42 per cent more likely to secure formal jobs six months after graduation than their counterparts with low levels of digital literacy. Islam et al. (2025) revealed that the delivery style of training played a moderating role in the relationship between digital skills development and employment among Kenyan university graduates, with blended-learning trainees having an employment rate 34 per cent higher than those undergoing training delivered solely online. Nyale et al. (2025) confirmed that employers place very high importance on practical digital skills acquired through training, with 78 per cent of respondents willing to prioritise candidates who demonstrate digital skills.

The findings by Tenya et al. (2024) indicate that Kenyan universities with blended learning environments and adequate resources produce graduates who score highly in digital competence and have better employment prospects than universities that mainly use traditional methods or online modes of delivery. According to Chola (2026), the development of digital competence is a significant predictor of the employment status of university graduates, as digital skills account for roughly 31 per cent of the variance in employment outcomes among university graduates from Kenya. The combined evidence implies that the relationship between training and employability does not depend only on the digital content but also on its delivery mode and competency development.

This study addresses the gap identified above by investigating the moderating role of training delivery mode on the relationship between digital literacy training and the acquisition of digital competencies among university students in Kenya. Specifically, the study investigated the moderating role of the mode of delivery of training in the relationship between digital literacy training and the acquisition of digital competencies among university students in Kenya, guided by the research question: How does the mode of delivery of training affect the relationship between digital literacy training and acquisition of digital competencies among university students in Kenya? This study is important from a theoretical perspective since it empirically investigates the Technology Acceptance Model's assumptions regarding the effects of mode of delivery on technology acceptance and skill acquisition. This study is important from a practical perspective because it provides institutions of higher learning and policymakers with guidance on how to deliver training.

## 2.0 LITERATURE REVIEW

From a global perspective, the relationship between digital literacy and graduate employability has been widely studied, and it is generally accepted that digital skills are essential for entering the workforce in the twenty-first century. Digital skills are among the top ten competencies necessary for employability across all sectors, as noted by the World Economic Forum (2025). It is believed that more employers view digital literacy as a minimum requirement rather than a specialised ability. Such a global trend was supported by the rapid pace of technological development, as automation, artificial intelligence, and digitalisation are transforming labour demands across almost all sectors. The fact that people with high levels of digital

competence are more successful in the labour market has been demonstrated many times (Scherer et al., 2019).

Nevertheless, it is evident that even with this worldwide acknowledgement of the importance of digital literacy, significant gaps remain in the relationship between digital competency and employability. The Organisation for Economic Co-operation and Development (2022) noted that many nations have devoted considerable effort to developing individuals' digital skills; however, no concrete evidence has been found regarding the efficiency of various training methods in producing employable graduates. The World Bank's (2024) research revealed that many digital skills training programs are available in both developing and developed countries; however, very little evidence exists on what works and how training translates into employment.

According to the ILO (2024), digital skills training to increase employability depends on several factors beyond access to training, including, among others, the quality of instruction and the mode of delivery. Means et al. (2013) found that blended learning methods were more effective than purely online methods in developing skills, with the greatest improvements achieved through face-to-face sessions for practice and problem-solving. The significance of this research finding cannot be overstated for graduates' employability, as employers value practical skills most.

According to Scherer et al. (2019), perceived usefulness and perceived ease of use act as mediators between training and technology adoption. This finding is particularly significant for employability, as it indicates that training should not only help graduates develop the necessary competencies but also foster positive perceptions that enable them to apply those competencies effectively in the professional world. The importance of performance and effort as predictors of technology use has been established by Venkatesh et al. (2003). The authors have demonstrated that both performance expectancy and effort expectancy significantly influence behavioural intentions to use technology, which in turn impact technology use in work contexts. Collectively, these studies indicate that the path from digital literacy training to employability is mediated by competency development and perceptions, enabling graduates to apply their competencies effectively in the workplace.

In Africa, the issue of graduate employability in the digital age is more urgent, given the continent's demographic advantage and the need to create productive jobs for millions of young people entering the labour market each year. According to the ILO (2024), Africa is home to the youngest population in the world, with about 60 per cent under 25, making the creation of employable skills an essential agenda item for economic development on the continent. Nevertheless, research across the continent has shown a considerable mismatch between the digital skills developed through education and those required by employers, with many graduates lacking the digital skills needed for formal employment (Vitae, 2025).

There has been growing empirical research on the relationship between digital literacy training and graduate employability in Africa. In Uganda, the Skills for Digital Jobs program, which included extensive hands-on training combined with mentoring by professional trainers and industry experts, had an impressive completion rate of 96 per cent and a job transition rate of 48.5 per cent (United Nations Development Programme [UNDP], 2025). The success of the above-mentioned program can be linked to its blended delivery method, as it offered trainees both theoretical knowledge delivered via online modules and practical experience gained through in-person mentoring and hands-on training.

Importantly, the assessment of the program showed that graduates who took part in the blended program not only demonstrated higher levels of digital literacy but also felt more confident when using the gained knowledge in a workplace environment, performed better on technical interviews, and showed increased problem-solving skills in practical situations (UNDP, 2025). Such employment outcomes could be achieved thanks to the hands-on training delivered to trainees, showing that the way training is delivered greatly influences not only competency development but also employability.

According to research from Senegal (Vitae, 2025), about 27 per cent of Sub-Saharan African graduates do not meet job-readiness criteria due to a lack of digital competencies, a gap that could be addressed by enhancing training methods. The research showed that graduates who had been involved in blended learning were much more likely to secure formal employment opportunities than those who received purely e-learning or traditional classroom training, due to the acquisition of practical skills through practice. Also, it became clear that employers could easily identify graduates who had undergone blended training by their ability to answer practical questions, use digital skills confidently, and apply their skills to workplace problem-solving (Vitae, 2025). In this qualitative research, there is no automatic connection between the provision of digital literacy training and graduate employability; rather, it depends on the development and utilisation of competencies.

In Kenya, the Jitume Programme is a good example of the combined learning strategy, as it combines online training in digital skills with practical laboratory lessons, supported by mentors in the country's network of digital hubs (Ministry of Education, 2024). With the help of this programme, 16,072 youths have received training in digital skills, exceeding the target, and the programme has been successfully integrated with special certificates, such as the Google Android Developer Certification (TVET Authority, 2023). As noted by ChildFund (2025), the main reason for the programme's successful implementation was its combined nature, which enabled learners to access theoretical knowledge online and receive practical assistance in face-to-face lessons. Employers who employed programme graduates reported that programme graduates demonstrated stronger practical skills, greater self-confidence in using digital skills, and higher results in technical interviews than graduates of purely online programmes (ChildFund, 2025).

However, at the national level, the development of digital skills in Kenya has been quite successful due to different initiatives by the Kenyan Government. For example, the Digital Economy Blueprint (Ministry of ICT, 2022) presents a well-developed concept aimed at developing digitally literate individuals ready to participate in the global digital economy. One such program is Ajira Digital, through which about 1.5 million youths have received training in digital skills. Another program is Jitume, which is meant to integrate digital skills into the TVET education system. Furthermore, according to the Commission for University Education (2022), undergraduate courses must include digital literacy modules.

Despite such measures, the results on the effect of digital literacy training on enhancing employability outcomes among graduates in Kenya show many challenges. The research conducted by Chola (2026) uncovered many deficiencies in the development of advanced digital competencies, such as data analysis, artificial intelligence, cybersecurity, and the Internet of Things, which are evident across all types of institutions in Kenya despite the availability of training in basic digital skills. Importantly, Chola (2026) showed how these deficiencies in digital competencies translate into poor employability outcomes, as consistent employer reports indicate that graduates lack the advanced digital skills required to gain formal employment. Similarly, Barke (2021) shows that most university students in Kenya have received training in

basic digital skills but not in advanced digital competencies, which are highly valued by employers and negatively affect these students' employability outcomes. Finally, Tenya et al. (2024) show a significant disparity between students' perceived level of digital proficiency and their actual competence.

It has been noted that the FKE (2023) has been quite vocal about the skills gap, and only 23 per cent of employers are satisfied with the level of digital literacy among graduates, particularly in data analysis, digital communication, cybersecurity, and cloud computing. Such dissatisfaction among employers has important implications for graduate employability, since Chola and Wanami (2026) found that, in cases where blended and work-integrated learning approaches were used, employability outcomes were 80.3 per cent. In contrast, in less-resourced institutions, they were 73.97 per cent. The key point emerging from such results is that merely developing competencies is not enough; it is about how those competencies are developed.

Musuva (2026) provided further evidence by demonstrating that Kenyan graduates with advanced digital competencies developed through hands-on, practical training were 42 per cent more likely to secure formal employment within six months of graduation compared to those with only basic digital skills. Islam et al. (2025) confirmed that the training delivery mode significantly moderated the relationship between digital skills acquisition and job placement, with blended-learning participants showing a 34 per cent higher employment rate than online-only participants, highlighting the critical role of delivery mode in employability outcomes.

**Theoretical Framework: Technology Acceptance Model (TAM)**

The Technology Acceptance Model by Davis (1989) serves as the theoretical basis for examining how the delivery method of training will moderate the effect of digital literacy training on competency and, hence, the employability of graduates. The TAM model suggests that one's attitude towards using technology hinges on two core constructs: perceived usefulness and perceived ease of use. According to Davis (1989), "perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his or her job performance", while "perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort".

With regard to digital literacy training and graduate employability, the Technology Acceptance Model states that, for training to succeed, it is not enough to teach learners skills, as their perceptions of the technology's usefulness and ease of use can greatly impact learning outcomes and employment. Mode of delivery plays an important role here, as it can influence learners' perceptions, which in turn affect how they learn and their ability to apply their competences later in the workplace. For example, face-to-face learning will help develop a better perception of ease of use. In contrast, a blended learning mode combines the convenience of online learning with the support of face-to-face interactions. In contrast, a fully online learning approach could make it difficult for learners to understand certain concepts and develop the needed skills due to a lack of support.

The relationship between TAM constructs and graduate employability is particularly important for understanding how digital competencies translate into employment outcomes. Venkatesh's TAM was further developed by Davis (2000) into TAM2, showing that the effects of social influence and cognitive instrumental process affect perceived usefulness, implying that the manner in which training is carried out influences the individual's perception as well as the graduates' perception of the role of technology in their

profession. The importance of employability is evident in the fact that graduates who see digital technologies as useful and easy to use will be able to use these tools effectively in the workplace, thus increasing their chances of employment. Venkatesh et al. (2003) provided further understanding by developing the Unified Theory of Acceptance and Use of Technology (UTAUT), showing that performance expectancy and effort expectancy strongly predict behavioural intention to use technology, which in turn influences actual use.

The model is highly relevant to this research because it offers insight into the reasons why delivery mode is important to both competency development and employability, since delivery modes influence the learner's perception of how useful and easy digital technologies are, hence impacting the efficacy of the training in the development of competencies and how the competencies translate into employability.

**Training Delivery Mode and Graduate Employability**

The link between the way training programs are delivered and graduate employability has been explored empirically to a high degree, with findings indicating that the mode of delivery affects not only competency development but also employment outcomes. Means et al. (2013) examined 45 previous studies comparing online and hybrid modes of teaching, finding that the hybrid mode is superior to the former in all areas, with the largest differences noted in areas involving face-to-face classes for practical tasks and problem solving. This conclusion is highly significant for graduate employability, as practical skills are exactly what employers need in their employees.

Chola and Wanami (2026) found that despite the stipulations of Competency-Based Education and Training (CBET), 86.5 per cent of lecturers continue to use the traditional lecture approach due to a lack of resources and poor trainer capacity. Nevertheless, when blended and work-integrated learning strategies were applied, employability was significantly higher, reaching 80.3 per cent, whereas at other institutions it was 73.97 per cent. As we can see, training approaches have a serious impact not only on the learning process, but also on the ability to find a job afterwards. For example, according to research by Musuva (2026), Kenyan students with advanced digital competencies acquired through blended learning had a 42 per cent chance of securing formal jobs within six months after graduation, compared with those with only basic digital competencies acquired through a traditional lecture approach. According to Nyale et al. (2025), employers highly value practical digital competencies acquired through training, as 78 per cent of surveyed employers stated that they would prefer to hire candidates with applied digital competencies over theoretical knowledge alone.

The qualitative evidence also sheds more light on how the competencies lead to employability. According to research by Islam et al. (2025) the employers interviewed confirmed that students with high digital competencies had an improved ability to solve practical problems in the workplace, greater confidence in utilising digital technologies when solving real-world problems, and performed better in technical interviews. Specifically, the employers were interested in competencies that enabled solving workplace problems, cooperating, and adapting to digital technologies, rather than theoretical knowledge alone. The qualitative evidence provides additional information that the relationship between training and employability is mediated by competencies used to perform workplace-related tasks. Tenya et al. (2024) found that in Kenyan universities where blended learning is supported by adequate infrastructure, graduates have higher levels of digital competencies and employability than those at traditional and online universities.

According to Chola (2026), digital competence development emerges as a robust indicator of graduate employability, with digital competencies explaining 31 per cent of the variance in employment outcomes among Kenyan university graduates, highlighting the need to understand how these competencies can be effectively developed through proper training delivery.

**Conceptual Framework**

Based on the theoretical framework above and empirical studies, this study hypothesises that the delivery method of training moderates the impact of digital literacy training on the development of digital competence, which in turn affects graduate employability. The blended learning model, comprising both online and face-to-face teaching methods, would be expected to provide better results in terms of competencies developed and, thus, employability than either method alone.

**Conceptual Framework**

| Independent Variable | Moderating Variable | Dependent Variable |
|---|---|---|
| Digital Literacy Training | Training Delivery Mode | Digital Competencies → Graduate Employability |
| • Duration of training | • Online only | • Basic digital skills |
| • Training intensity | • Face-to-face only | • Data analysis skills |
| • Curriculum relevance | • Blended learning | • Cybersecurity awareness |
| | | • Practical problem-solving |
| | | • Workplace digital application |

The expected relationships between the variables include, first, a positive prediction that digital competency acquisition will be predicted by digital literacy training, where high-quality training will lead to better competency development. Secondly, the method of training delivery is expected to influence the relationship, such that blended learning yields greater competency improvement than either online or face-to-face delivery alone. Thirdly, the interaction between training and delivery should influence digital competencies, which predict employability perceptions. Finally, digital competencies should mediate the interaction between training and mode of delivery on perceived employability. The above relationships are based on TAM predictions that the mode of delivery influences perceived usefulness and ease of use, which in turn predict both skills and their application in professional situations.

## 3.0 METHODOLOGY

The convergent mixed-methods design, combining quantitative survey data and qualitative interview data, was used in the current study. The selected design was chosen for its ability to gather and analyse different types of data separately and integrate findings to provide better insight into the research problem under consideration than would be possible if the approaches were used separately (Creswell & Plano Clark, 2018). The convergent design is especially appropriate for use in moderation studies as the statistical analysis of the quantitative data may consider the interaction effect of training delivery mode on the connection between training and competencies while the qualitative data may shed light on the reasons for the identified effects from the perspective of the students, university administrators and employers (Tashakkori & Teddlie, 2010). Both data sets were analysed using the triangulation method.

The quantitative portion tested the moderation hypothesis by examining whether the mode of training delivery significantly moderates the relationship between digital literacy training and the development of

digital competencies. A cross-sectional survey research design was employed, in which data were collected using structured questionnaires from 384 senior university students. This made it possible to compute conditional effects, interaction terms, and confidence intervals using the PROCESS macro (Model 1), which is particularly used in moderation analyses via bootstrapping (Hayes, 2018).

The dependent variable was digital competencies, the independent variable was digital literacy training, and training delivery mode was the moderating variable, with online-only delivery as the reference group. The qualitative part assessed perceptions of various stakeholders regarding the effectiveness of training delivery modes, the reasons for selecting certain delivery modes, barriers to blended learning, and the influence of the delivery mode on learning processes and employability readiness. Data collection was conducted through semi-structured interviews with stakeholders from 20 higher education institutions (deans, ICT managers, and curriculum developers) and 15 human resource managers. This qualitative aspect helped explain the process of moderation, especially how face-to-face practical workshops increased perceived ease of use and perceived usefulness, according to TAM (Davis, 1989).

The study was carried out at six universities in Kenya, including three public universities (University of Nairobi, Moi University, and Masinde Muliro University of Science and Technology) and three private universities (Strathmore University, United States International University-Africa, and Daystar University). The selection of these universities was based on various parameters, including institutional diversity, geographical diversity, programme diversity, accessibility, and institutional reputation. Public and private universities were included in the sample to represent diversity among higher education institutions in Kenya, given that public universities have different resources than private universities (Cheeseman et al., 2016).

These institutions have been selected in three distinct geographical locations, namely Nairobi, Kiambu, and Western Kenya, to avoid bias towards urban centers which have ICT infrastructure well established, as highlighted by Chola and Wanami (2026), who observed that university graduates from other regions in Kenya are 54 to 69 per cent less likely to be formally employed compared to their colleagues in Nairobi because of infrastructure gap. These universities offer several programs in both STEM and non-STEM fields, each with a digital literacy program and industry connections, making them ideal for studying the research problem.

The targeted population was 8,400 final-year undergraduate students from the six universities. According to the Yamane formula, at a 95 per cent confidence level and a 5 per cent error rate, a sample size of 384 respondents was determined. A stratified sampling method was used in data collection involving quantification. The strata used for data quantification were the type of university (public or private) and the programme area (STEM or non-STEM). To achieve proportional allocation of sample sizes, the sample size for students from each university was proportional to the institution's total number of fourth-year students. In public universities, 216 students (56.3%) were sampled, while in private universities, 168 (43.7%) were sampled. Within each university, the sample was further stratified by programme area, and students were sampled in equal numbers across the two programme areas. There were 54.2 per cent (208 students) STEM students and 45.8 per cent (176 students) non-STEM students.

Subsequently, simple random sampling was conducted among students within each university stratum to obtain a sample in which each fourth-year student had an equal chance of selection. This resulted in

proportionate stratified sampling that would allow representation of the target population across the two types of universities and programme areas, thereby increasing the generalizability of the research findings. For the collection of qualitative data, purposive sampling was employed to select 20 university administrators (deans, ICT managers, and curriculum designers) and 15 human resource managers from companies that employ university graduates.

**Table 1: Population Sampled**

| University Type | Number of Universities | Students Sampled | Administrators Interviewed | HR Managers Interviewed |
|---|---|---|---|---|
| Public Universities | 3 | 216 | 12 | 8 |
| Private Universities | 3 | 168 | 8 | 7 |
| Total | 6 | 384 | 20 | 15 |

The following components were included in the structure of the student questionnaire: demographics, prior training in digital literacy (15 questions evaluating duration, intensity, and extent), assessment of digital competencies (25 questions assessing basic, intermediate, and advanced competencies on a five-point Likert scale), mode of training which could be either online only, face-to-face only, or both, and employability (10 questions about ability to find work). The reliability test demonstrated that Cronbach's alpha was 0.89 for the training scale and 0.92 for the digital competencies scale, indicating excellent internal consistency. Face validity was assessed by three subject-matter experts in educational technology and research methodology. Content validity was ensured by aligning the questions with the conceptual definitions in the literature.

Additionally, interview guides were developed for university administrators and HR managers to assess their perceptions of training effectiveness, preferred training modes, the problems they face during the process, how training can be improved, and how digital literacy skills can lead to better employment opportunities. These interview guides were piloted with two university administrators and two HR managers who were not part of the sample population, resulting in modifications to the questions and probes. All the interviews were conducted in English, recorded, and transcribed.

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) Version 27.0, and moderating factors analysis employed Hayes' PROCESS Macro Model 1 with 5,000 bootstrap samples. Descriptive statistics were computed as frequencies, means, and standard deviations for demographic variables, training involvement, and digital competencies, respectively. The Pearson correlation test was used to explore relationships among variables. Moderating factor analysis was used to examine whether the relationship between digital literacy training and digital competencies was moderated by the training mode, with the online-only mode as the reference point. Data analysis provided unstandardized regression coefficients, standard errors, t-values, p-values, and conditional effects for each mode of training provision, together with 95 per cent confidence intervals. Model fit statistics included $R^2$ and F-values. Qualitative interview data were analysed using thematic analysis, which comprises six steps according to Braun and Clarke (2006).

To maintain rigour in the analysis, two researchers independently coded, and differences between their analyses were reconciled through discussion until consensus was reached. Themes were identified through deductive processes based on research questions and TAM constructs as well as through inductive processes based on the data. The results of both parts were synthesised through joint displays and narratives.

**Limitations of the Study**

The study faced the following limitations. First, the cross-sectional study design does not allow for causal inference. This calls for future research to use experimental designs with random assignment of individuals to online-only, face-to-face-only, and blended learning programs to identify the causal effects of these programs on both competency development and employability outcomes. Second, no mediation process has been evaluated in this study regarding the moderation effect.

## 4.0 FINDINGS AND DISCUSSION

### Demographic Characteristics of Respondents

The demographics of the 384 student respondents are given in Table 2. The sample had equal gender representation: 51.0 per cent (196) male and 49.0 per cent (188) female respondents. This is significant, considering the STEM sector in Kenya, where only 21.4 per cent of STEM professionals are women (Mastercard Foundation, 2025). This may be attributed to an increasing trend among female students choosing technical courses, or to the inclusion of non-STEM courses, in which female participation tends to be higher. Most of the respondents (56.3%) were from public universities, as is common in samples from Kenya's higher education sector. STEM students made up 54.2 per cent (208 students) of the sample, whereas non-STEM students represented 45.8 per cent (176 students). Fourth-year students made up 70.8 per cent (272 students) of the respondents, which was expected, given the aim of recruiting students just before their graduation.

**Table 2: Demographic Characteristics of Student Respondents**

| Characteristic | Category | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 196 | 51.0 |
| | Female | 188 | 49.0 |
| **University Type** | Public | 216 | 56.3 |
| | Private | 168 | 43.7 |
| **Program Area** | STEM | 208 | 54.2 |
| | Non-STEM | 176 | 45.8 |
| **Year of Study** | 3rd Year | 112 | 29.2 |
| | 4th Year | 272 | 70.8 |

This implies that digital literacy programs affect an aspect that is equally important for overcoming the gap within the digital labour force. This conclusion confirms the MasterCard Foundation's (2025) finding that an increasing number of women are enrolling in digital skills programs through initiatives such as AjiraForShe. Nonetheless, this outcome runs counter to the findings of Chola (2026), which found that men had better digital technology skills than women, even with increased female enrollment in digital skills programs. Therefore, future research should consider disaggregating the results according to gender.

Fourth-year students (70.8%) were the dominant group in the sample because the research aimed to recruit final-year students at the end of their digital literacy journey, before entering the labour market.

**Extent of Digital Literacy Training**

Table 3 shows data on students' training in digital literacy, and it is evident that there is a significant difference between their basic and advanced digital literacy skills. All the students had been trained in basic computer skills at 89.6 per cent, the Microsoft Office suite at 84.2 per cent, and internet and digital communication at 78.4 per cent. The high level of participation in basic digital skills training aligns with the requirements set by the Commission for University Education (2022) that the digital literacy module be integrated into all undergraduate programs. The percentage of students who had been trained on advanced digital skills was relatively low at 42.3 per cent, and data analysis in Excel, SPSS, or Python was at 34.5 per cent.

Regarding the quality of training, assessed through a rating of 1 to 5 by students, it was found that there were moderately good ratings for basic skills, which ranged from 3.78 to 3.92, but low ratings when it came to advanced skills, such as data analysis (rated 3.23), cybersecurity awareness (3.01), cloud computing (2.89), and digital marketing (2.76). Poor ratings for advanced courses stem from a lack of skilled instructors, outdated curricula, and insufficient opportunities for practice. These results hold considerable importance regarding graduates' employability since advanced skills like data analysis, cybersecurity, and cloud computing are the ones valued the most by employers, who mentioned that data analysis is one of the top skills gaps (at 67 per cent) followed by digital communication (58%) and cybersecurity awareness (49%) (Federation of Kenya Employers, 2023).

**Table 3: Digital Literacy Training Participation**

| Training Type | Received (%) | Mean Duration (hours) | Mean Quality Rating (1-5) |
|---|---|---|---|
| Basic computer skills | 89.6 | 45 | 3.78 |
| Microsoft Office suite | 84.2 | 60 | 3.92 |
| Internet and digital communication | 78.4 | 30 | 3.65 |
| Data analysis (Excel, SPSS, Python) | 42.3 | 75 | 3.23 |
| Cybersecurity awareness | 34.5 | 20 | 3.01 |
| Cloud computing | 23.4 | 40 | 2.89 |
| Digital marketing/SEO | 18.2 | 50 | 2.76 |
| Any formal digital training | 78.4 | 120 (total) | 3.56 |

This gap between basic and advanced digital skills training aligns with the results of a systematic review by Chola (2026), which found substantial gaps in advanced skills such as data analytics, AI applications, cybersecurity, and the Internet of Things across all institutional groups in Kenya. The same was found by Barke (2021), who observed that although most Kenyan university students are trained in basic digital skills, there are no advanced skills training programs. This result agrees with Vitae (2025), which showed that about 27 per cent of Sub-Saharan African graduates are not work-ready due to digital skills gaps.

**Digital Competency Levels**

The table below (Table 4) presents the competencies described across nine digital domains. The students' competency in basic digital domains is generally moderate to high. The areas include word processing (M=4.23; 71.2% competent), basic digital literacy (M=4.12; 67.8% competent), digital communication (M=4.01; 61.2% competent), and Internet research (M=3.98; 58.9% competent).

**Table 4: Self-Reported Digital Competency Levels (1=Very Low, 5=Very High)**

| Competency Area | Mean | SD | % Proficient (4 or 5) |
|---|---|---|---|
| Basic digital literacy | 4.12 | 0.78 | 67.8 |
| Word processing | 4.23 | 0.82 | 71.2 |
| Spreadsheets | 3.89 | 0.91 | 54.3 |
| Internet research | 3.98 | 0.85 | 58.9 |
| Digital communication (email, chat) | 4.01 | 0.88 | 61.2 |
| Data analysis | 2.89 | 0.92 | 23.4 |
| Cybersecurity practices | 2.78 | 0.95 | 19.8 |
| Cloud collaboration tools | 2.65 | 0.98 | 16.5 |
| Basic coding/programming | 2.34 | 0.89 | 12.3 |

On the other hand, there were substantial deficiencies in students' advanced digital competency levels. Students had poor data analysis proficiency (mean 2.89), with only 23.4 per cent proficient. Poorer still were their cybersecurity practices (mean 2.78, 19.8% proficient), cloud collaboration tools (mean 2.65, 16.5% proficient), and basic coding/programming (mean 2.34, 12.3% proficient). These results closely align with the percentage of employers who have expressed dissatisfaction, as reported by the Federation of Kenya Employers (2023). The lack of data analysis proficiency is remarkably similar to the employers' dissatisfaction with the same skills (67%), showing that students' self-assessment is fairly accurate. However, Tenya et al. (2024) noted discrepancies between self-assessments and actual proficiency levels and therefore concluded that actual competency levels were even lower than self-reported levels.

**Correlation Analysis**

According to the Pearson correlation matrix in Table 5, all variables are positively correlated with one another. Digital literacy training showed a strong positive correlation with digital competencies ($r = 0.62$, $p < 0.01$), indicating that the more training was provided, the better digital competencies were achieved. Training delivery method showed a moderately positive correlation with digital competencies ($r = 0.41$, $p < 0.01$) and perceived employability ($r = 0.38$, $p < 0.01$), indicating that higher competence achieved through blended or traditional training methods was associated with higher perceived employability. Digital competencies had the highest correlation with perceived employability ($r = 0.67$, $p < 0.01$).

**Table 5: Pearson Correlation Matrix**

| Variable | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Digital Literacy Training | 1.00 | | | |
| 2. Digital Competencies | .62** | 1.00 | | |
| 3. Training Delivery Mode | .34** | .41** | 1.00 | |
| 4. Perceived Employability | .56** | .67** | .38** | 1.00 |

**p < 0.01

This study adds to the current literature with empirical evidence that the connection between training and competencies is not constant and depends on the type of training delivery, and that digital competencies are a strong predictor of employability. This research contributes to the current body of literature by demonstrating that the connection between training competency and training delivery is highly dependent on how training is delivered, and that the strongest approach is blended learning.

**Moderation Analysis**

Based on the moderation analysis reported in Table 6, the conditional impact of training on competencies varies significantly by training mode. The training-competencies coefficient for those who received training entirely online was 0.234 (p = 0.023). In contrast, the training-competencies coefficient for those trained only with the face-to-face method was slightly higher, at 0.267 (p = 0.018). This constitutes a non-significant increase of 0.033 (p > 0.05) compared to online training. On the other hand, the conditional effect was even greater for blended learning, with a coefficient of 0.412 (p = 0.001). Moreover, the interaction coefficient for blended learning and online-only delivery equals β = 0.178 (p = 0.024), indicating that training has a significantly stronger effect on competencies under blended learning than under online-only delivery. In other words, the impact of training on competencies under blended learning conditions is about 76 per cent higher than that of online-only delivery.

**Table 6: Moderation Analysis Results (Training Delivery Mode as Moderator)**

| Delivery Mode | Coefficient for Training→Competencies | p-value | Conditional Effect at Mode |
|---|---|---|---|
| Online only | 0.234 | 0.023 | Baseline |
| Face-to-face only | 0.267 | 0.018 | +0.033 (n.s.) |
| Blended learning | 0.412 | 0.001 | +0.178* |

*Note: Interaction term β = 0.178, p = 0.024. PROCESS Model 1 with 5,000 bootstrap samples. Dependent variable = Digital Competencies. $R^2$ = 0.412.

The findings of this study contribute to the existing literature by offering, for the first time, empirical evidence from a Kenyan context that the mode of training delivery is not just a pedagogical choice but an important factor in determining competence development and, subsequently, graduate employability. The findings reveal that digital literacy training may yield vastly different returns depending on the mode of delivery, with the blended mode delivering twice as much competency development as the online-only mode. The current findings extend those of Means et al. (2013), whose meta-analysis showed that blended learning outperforms online learning, and indicate that the superiority of blended learning is more apparent in the Kenyan context. The practical implications of these findings cannot be overstated: universities with blended-learning infrastructure will produce graduates with high levels of competence

and employability, given the close relationship between competencies and perceived employability in this research.

**Qualitative Findings**

Thematic analysis of interview data from students, university administrators, and HR managers revealed three major themes:

**Theme 1: Effectiveness of Blended Learning for Employability**

Students and staff agreed that blended learning methods were better for developing employable skills. One of the students argued that:

"While online modules worked well for theories, I think I needed some classroom learning to master data analysis. It was great being able to interact with people and practice because it made a huge difference. In case of fully online classes, if anything went wrong, I would just stop because I would have no option other than to quit" (Student 203).

An HR manager highlighted the advantage of using a blended learning method:

"During interviews of the graduates, we can quickly understand whether it is a graduate of blended or fully online course. Those who had some hands-on experience can answer some practical questions on scenarios and projects that they undertook during training sessions" (HR Manager 12).

This theme helps explain the quantitative result indicating that blended learning led to statistically significant increases in competency compared with the pure online learning delivery mode, and it demonstrates how such competencies translate into employability. According to qualitative research, elements of face-to-face learning contribute to improved comprehension and skill development, allowing learners to connect theory with practice. It fits in the framework of the Theory of Acceptance, since the face-to-face element contributes not only to increased perceived ease of use through immediate help but also to increased perceived usefulness through practical applications.

**Theme 2: Variation in Quality and Employability Outcomes among Different Institutes**

The respondents identified considerable differences in the quality of digital literacy education across institutions, which would affect the employability of their graduates. In particular, private universities were considered to have better, more up-to-date curricula and more modern facilities and industry connections than certain public universities. According to one administrator:

"There is considerable variation in the quality of digital literacy education. While some universities have spent a lot on building up digital laboratories and industry collaboration, others are working with old curricula and poor facilities. There is quite an imbalance among graduates coming out of such institutions" (Administrator 14).

This theme implies that it enables understanding of contextual elements that shape the relationship between training, competency, and employability, indicating that resource availability and industry partnerships within an institution play a significant role in determining the effectiveness of training and,

ultimately, employability. The level of competence varies with the availability of resources, making graduates better equipped to compete in the job market.

**Theme 3: Limited Resources as Barrier to Employability-Enhancing Blended Learning**
However, administrators from public universities were aware of the shortage of resources in introducing blended learning even though they knew about the benefits of this technique for competency development and employability.

"Our student to computer ratio is 22:1. Our computers are 5 years old. One IT instructor teaches 400 students. It is obvious that blended learning has more benefits in terms of skill development, but we lack the resources" (Administrator 8).

This sub-theme provides insight into why blended learning is not widespread, despite evidence that it is more effective at developing graduates' competencies and employability. Shortages of resources, especially computers, the Internet, and qualified instructors, constitute considerable obstacles to introducing the best techniques for delivering training. This finding has significant implications for policy makers.

## 5.0 CONCLUSION AND RECOMMENDATIONS

**Conclusion:** This study aimed to examine whether the delivery mode of training would moderate the influence of digital literacy training on competence development among university students in Kenya. It was found that the training delivery mode moderates the relationship between training and competence, with a strong interaction term ($\beta = 0.178$, $p < 0.024$). The combined training approach led to a 76 per cent higher level of competence than when the online delivery mode was used alone ($\beta=0.412$ compared to 0.234). This means that the use of both online theoretical training and practical training was highly effective. However, there was no notable difference in competence levels when the online training mode was replaced with the face-to-face mode ($\beta = 0.033$).

The above results were complemented by qualitative data from students, who stated that face-to-face interaction was key to understanding difficult concepts. At the same time, administrators and employers preferred a blended approach to instruction. Nevertheless, the research also found notable limitations of resources such as a student-to-computer ratio of 22:1 in some public universities, which is much higher than the recommended ratio of 5:1. All the above results serve to show that the mode of delivery of digital literacy training is a key determinant of competency and employability of graduates since the blended approach creates more competent graduates than other modes.

**Recommendations:** Policy, institutional, and regulatory measures regarding digital literacy and blended learning in higher education should be improved. This can be achieved through the development of minimum standards for blended learning, digital competencies evaluation and training by the Commission for University Education (CUE) and the Ministry of Education. Institutions should harmonise policies and curricula on the issue to meet the minimum set standards, conduct audits of existing digital literacy programs, and budget for basic facilities, including computers, internet connectivity, learning management systems, and instructor training. Funding should be channelled to institutions that face challenges accessing these digital resources.

The universities must also improve their competency-based assessments, follow up with graduates to determine where they are employed, and continually assess their programs to ensure that their trainees acquire the skills required by the labour market. Collaboration between universities and industry must be enhanced to ensure that students receive internships, practical activities, mentoring, and clear information from employers on the necessary digital skills. The blended learning approach should be institutionalised, combining online learning with practical activities. This would enhance digital skills and graduates' employability.

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