

HARNESSING INNOVATIVE TVET FOR ADVANCED DIGITAL ACQUISITION IN UNIVERSITIES IN RIVER STATE

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Abstract

The study investigated the harnessing innovative TVET for advanced digital acquisition in Universities in River state Nigeria. Three research questions guided the study. The study adopted descriptive survey research design and was carried out in technical colleges in River State. Instrument for data collection was a questionnaire developed by the researchers through literature review titled: Harnessing Innovative TVET for Advanced Digital Acquisition in Universities (HTADAU) Questionnaire. The instrument was face validated by three experts from the Department of Vocational Technology and Entrepreneurship Education, Faculty of Education, Enugu State University of Science and Technology (ESUT), Agbani, Enugu State. The population of the study comprised 45 respondents, consisting of 30 students (66.7%) and 15 instructors (33.3%) from two technical colleges in River State. Since the population was relatively small and manageable, the entire population was used for the study. Consequently, there was no sampling since the population size was manageable. The reliability of the instrument was established using the Cronbach Alpha method, which yielded a reliability coefficient of 0.82, indicated that the instrument, was reliable for the study. Data was collected by the researchers with the help of two research assistants. Data collected was analyzed using mean and standard deviation. The findings revealed that innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State. This finding also suggests that universities are increasingly adopting digital learning platforms, virtual laboratories, learning management systems, digital assessment tools, and technology-based instructional approaches to enhance students' acquisition of contemporary digital competencies. The finding of the study also revealed that innovative TVET significantly influences students' acquisition of advanced digital competencies in universities in Enugu State. The result implies that innovative TVET contributes to the development of digital literacy, programming skills, cybersecurity awareness, cloud computing knowledge, digital communication, problem-solving abilities, and technology-based entrepreneurship competencies among students. Based on the findings of the study, It was recommended among others that effective harnessing of innovative TVET remains a viable strategy for enhancing digital competence, employability, innovation, and workforce readiness among university graduates in River State.

Keywords: Harnessing, innovative, TVET, digital, acquisition, universities

Introduction

The 21st century has witnessed unprecedented technological advancement, transforming virtually every sector of human society, including education, healthcare, agriculture, commerce, and governance. The rapid emergence of digital technologies such as artificial intelligence, cloud computing, big data analytics, robotics, cybersecurity, the Internet of Things (IoT), and machine learning has significantly altered the nature of work and skills required in contemporary economies. Consequently, educational institutions, particularly universities, are under increasing pressure to equip students with advanced

digital competencies necessary for effective participation in the global digital economy. According to Adeyemi and Adewale (2022) Technical and Vocational Education and Training (TVET) has emerged as a strategic approach for developing practical, employable, and technology-driven skills capable of addressing the demands of Industry 4.0 and the future of work. UNESCO emphasizes that modern TVET systems must be transformed to equip learners with digital, entrepreneurial, and innovation-oriented competencies required for sustainable development and economic growth (UNESCO-UNEVOC, 2024).

TVET refers to educational and training programmes designed to provide learners with practical knowledge, technical competencies, and occupational skills necessary for employment, self-reliance, and lifelong learning. Unlike conventional academic education, TVET emphasizes hands-on experiences, technological applications, and industry-oriented learning. Okolie et al (2022) noted that in recent years, the concept of innovative TVET has gained prominence due to the integration of emerging technologies, digital learning platforms, virtual laboratories, simulation technologies, artificial intelligence, and smart learning environments into vocational education. These innovations have expanded the scope of TVET beyond traditional technical trades to include advanced digital skills development, thereby enhancing learners' adaptability to evolving labour market requirements. According to UNESCO, digital transformation has become a central pillar of contemporary TVET systems globally, necessitating the incorporation of digital technologies into teaching, learning, curriculum design, and institutional management processes (UNESCO, 2023).

Advanced digital acquisition involves the process through which individuals obtain sophisticated digital knowledge, competencies, and technological skills required for effective engagement in digital environments. Such competencies include digital literacy, coding and programming, data analytics, artificial intelligence applications, cybersecurity awareness, cloud computing, digital communication, virtual collaboration, and technology-driven problem-solving skills. Oviawe (2016) observed that these competencies are increasingly recognized as essential requirements for employability and productivity in knowledge-based economies. Universities worldwide are therefore redesigning their curricula and instructional approaches to ensure that graduates possess relevant digital skills capable of meeting current and future workforce demands. UNESCO notes that digital transformation requires educational institutions to provide learners with knowledge, skills, attitudes, and lifelong learning opportunities needed to thrive in technology-driven societies and economies (UNESCO-UNEVOC, 2024).

In Nigeria, the increasing digitization of economic and social activities has heightened the need for educational institutions to prioritize digital skills acquisition among students. Despite significant investments in higher education, concerns remain regarding the employability of university graduates due to inadequate practical and technological competencies. According to Parua and Yang (2024), many graduates continue to face difficulties securing meaningful employment because their training often lacks sufficient exposure to industry-relevant digital technologies. Recognizing this challenge, the Federal Government of Nigeria and international development partners have intensified efforts to strengthen digital skills development through educational reforms and TVET transformation initiatives. UNESCO's Digital Transformation of TVET in Nigeria project highlights the importance of integrating digital competencies into TVET and higher education systems to enhance youth employability, innovation, and economic development (UNESCO, 2024). The relevance of innovative TVET in universities has

become increasingly evident as employers seek graduates who possess both theoretical knowledge and practical digital competencies. Nwachukwu (2020) stated that modern industries require workers capable of operating advanced technological systems, analyzing digital information, managing online platforms, and adapting to rapidly changing technological environments. Consequently, universities can no longer rely solely on traditional lecture-based instruction. Instead, they must adopt innovative TVET approaches that facilitate experiential learning, project-based education, digital simulations, virtual laboratories, industry partnerships, and entrepreneurship development. Such approaches not only improve students' technical proficiency but also foster creativity, critical thinking, collaboration, and innovation, which are essential attributes in the digital age (Parua & Yang, 2024).

River State occupies a strategic position in Nigeria's educational landscape, hosting several universities and tertiary institutions that contribute significantly to human capital development. The state government has demonstrated a growing commitment to digital transformation through digital literacy and skill development programmes (Okolie et al, 2022). Initiatives such as Digital Skills Nigeria (DSN) and the Digital Skill Innovation Programme have been implemented to enhance digital competencies among youths, civil servants, and entrepreneurs within the state. These programmes reflect the government's recognition of digital skills as critical drivers of socioeconomic development, innovation, and competitiveness in the contemporary world. The successful implementation of such initiatives provides a favourable environment for universities in River State to harness innovative TVET strategies for advanced digital acquisition among students.

Furthermore, the integration of innovative TVET into university education aligns with global trends toward digital transformation and sustainable development. The UNESCO-UNEVOC Medium-Term Strategy (2024–2026) emphasizes the need for TVET institutions to respond effectively to digital, green, and inclusive transitions by equipping learners with future-oriented competencies. This strategic direction recognizes that technological advancement is reshaping occupational structures and creating new opportunities for innovation, entrepreneurship, and employment. Universities that embrace innovative TVET practices are therefore better positioned to produce graduates capable of contributing meaningfully to national development and global competitiveness. Despite the growing recognition of digital skills acquisition, several challenges continue to hinder the effective implementation of innovative TVET in Nigerian universities. These challenges include inadequate digital infrastructure, insufficient funding, and limited access to modern technological equipment, shortage of qualified instructors, weak industry-academia collaboration, and outdated curricula that fail to reflect emerging technological trends. Such constraints often limit students' opportunities to acquire advanced digital competencies necessary for success in contemporary workplaces. Addressing these challenges requires coordinated efforts from government agencies, university administrators, industry stakeholders, and development partners to create enabling environments that support technology-driven teaching and learning. UNESCO identifies infrastructure development, curriculum reform, institutional transformation, and digital inclusiveness as critical factors for successful digital transformation in TVET systems (UNESCO, 2023).

Therefore, harnessing innovative TVET for advanced digital acquisition in universities in River State represents a timely and strategic response to contemporary educational and labour market demands. Through the effective integration of digital technologies, practical training methodologies, industry collaboration, and innovation-

driven curricula, universities can enhance students' digital competencies and improve their readiness for the future workforce. Such transformation has the potential to bridge existing skills gaps, promote entrepreneurship, enhance employability, and contribute significantly to sustainable socioeconomic development in River State and Nigeria at large. The success of this endeavour will depend on the commitment of stakeholders to invest in digital infrastructure, capacity building, policy support, and continuous curriculum innovation that aligns with global technological trends and labour market expectations.

Statement of the Problem

The rapid advancement of digital technologies has transformed the global labour market, creating an increasing demand for graduates who possess advanced digital competencies such as data analytics, artificial intelligence, cybersecurity, digital communication, cloud computing, and problem-solving skills. Despite the growing importance of these competencies, many university graduates in Nigeria, including those in River State, continue to face challenges in securing gainful employment due to inadequate practical digital skills. This situation is partly attributed to the persistence of traditional teaching methods, limited integration of technology-driven learning approaches, and insufficient emphasis on practical skill acquisition within university programmes. Consequently, a mismatch exists between the digital skills possessed by graduates and those required by contemporary industries, thereby contributing to graduate unemployment and underemployment.

Furthermore, although Technical and Vocational Education and Training (TVET) has been recognized globally as a viable strategy for developing industry-relevant skills, its innovative application in universities remains relatively inadequate. Many universities in River State still experience challenges such as inadequate digital infrastructure, limited access to modern technological equipment, insufficient funding, shortage of qualified personnel, and weak collaboration with industry partners. These constraints hinder the effective implementation of innovative TVET practices capable of equipping students with advanced digital competencies required in the digital economy. As a result, students may graduate without acquiring the practical technological skills necessary for productivity, innovation, entrepreneurship, and competitiveness in the modern workplace. Given the increasing emphasis on digital transformation and knowledge-driven economies, there is an urgent need for universities in River State to harness innovative TVET approaches to enhance advanced digital acquisition among students. However, the extent to which innovative TVET has been integrated into university education and its effectiveness in promoting advanced digital skills acquisition remains unclear. This gap in knowledge necessitates empirical investigation to determine how innovative TVET can be effectively utilized to improve students' digital competencies, enhance employability, and meet the evolving demands of the twenty-first-century workforce. It is against this backdrop that this study seeks to examine the harnessing of innovative TVET for advanced digital acquisition in universities in River State.

Purpose of the Study

The main purpose of this study is to examine the harnessing of innovative Technical and Vocational Education and Training (TVET) for advanced digital acquisition in universities in River State. Specifically, the study seeks to:

1. determine the extent to which innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State.

2. Examine the influence of innovative TVET on students' acquisition of advanced digital competencies such as digital literacy, programming, data management, cybersecurity, and digital communication skills in universities in River State.
3. identify the challenges and opportunities associated with harnessing innovative TVET for advanced digital acquisition in universities in River State.

Research Question

The following research questions guided the study;

1. To what extent to which innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State.
2. What are the influence of innovative TVET on students' acquisition of advanced digital competencies such as digital literacy, programming, data management, cybersecurity, and digital communication skills in universities in River State.
3. What are the challenges and opportunities associated with harnessing innovative TVET for advanced digital acquisition in universities in River State.

Methods

The study adopted a descriptive survey research design. The design was considered appropriate because it enabled the researchers to obtain information from students and instructors on harnessing innovative Technical and Vocational Education and Training (TVET) for advanced digital acquisition in universities in River State, Nigeria, without manipulating any of the study variables. The study was carried out in technical colleges in River State, Nigeria. The area was considered suitable because the institutions provide Technical and Vocational Education and Training programmes designed to equip learners with practical and digital skills required for the modern workforce. The population of the study comprised 45 respondents, consisting of 30 students (66.7%) and 15 instructors (33.3%) from two technical colleges in River State. Since the population was relatively small and manageable, the entire population was used for the study. Consequently, no sampling technique was adopted. The instrument used for data collection was a structured questionnaire titled "Harnessing Innovative TVET for Advanced Digital Acquisition Questionnaire (HITVETADAQ)." The questionnaire was developed by the researchers based on an extensive review of related literature and consisted of items designed to elicit responses on innovative TVET practices for advanced digital acquisition.

The instrument was face validated by three experts from the Department of Vocational Technology and Entrepreneurship Education, Faculty of Education, Enugu State University of Science and Technology, Agbani, Enugu State. Their comments and suggestions were used to improve the clarity, relevance, and adequacy of the questionnaire items before the final administration. The reliability of the instrument was established using the Cronbach Alpha method, which yielded a reliability coefficient of 0.82, indicating that the instrument, was reliable for the study.

The questionnaire was administered by the researchers with the assistance of two trained research assistants. The completed copies of the questionnaire were collected immediately after completion, resulting in a high retrieval rate. The data collected were analyzed using mean and standard deviation. Mean was used to answer the research questions, while standard deviation was used to determine the degree of variation in the respondents' opinions. The decision rule was based on a four-point rating scale. A mean score of 2.50 and above was accepted, indicating agreement with an item, while a mean score below 2.50 was rejected, indicating disagreement with the item. This criterion guided the interpretation of the findings throughout the study.

Results

Research Question 1: Determine the extent to which innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State.

Table 1: Mean rating and Standard Deviation of Responses on extent to which innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State.

S/N	Item statement	($\bar{X}$)	SD	Remark
1	Digital learning platforms are regularly used in teaching.	3.42	0.74	Agree
2	Virtual laboratories are available for practical learning.	3.15	0.81	Agree
3	Students are exposed to online collaborative learning tools.	3.28	0.76	Agree
4	Smart classroom technologies are utilized during instruction.	3.10	0.89	Agree
5	TVET programmes incorporate digital simulation software.	3.21	0.83	Agree
6	E-learning resources support students' practical learning.	3.38	0.72	Agree
7	Universities provide access to digital innovation hubs.	3.07	0.91	Agree
8	Students receive training on emerging digital technologies.	3.29	0.78	Agree
9	Digital assessment tools are frequently utilized.	3.19	0.82	Agree
10	Practical technology-based projects are encouraged.	3.46	0.70	Agree
11	Industry-related software applications are used in teaching.	3.13	0.88	Agree
12	Artificial intelligence tools are integrated into learning.	2.98	0.94	Agree
13	Universities provide internet facilities for digital learning.	3.40	0.73	Agree
14	Digital entrepreneurship training is incorporated into TVET programmes.	3.24	0.80	Agree
15	Learning management systems are effectively utilized.	3.31	0.75	Agree
	Cluster Mean	3.24	0.80	Agree

The results in Table 1 reveal a cluster mean of 3.24, which is above the benchmark mean of 2.50. This indicates that respondents agreed that innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State. The relatively low standard deviations suggest consistency in respondents' opinions regarding the integration of digital technologies and innovative instructional approaches within university TVET programmes.

Research Question 2: Examine the influence of innovative TVET on students' acquisition of advanced digital competencies in universities in River State.

Table 2: Mean rating and Standard Deviation of Responses on influence of innovative TVET on students' acquisition of advanced digital competencies in universities in River State.

S/N	Item statement	($\bar{X}$)	SD	Remark
1	Innovative TVET improves students' digital literacy skills.	3.51	0.68	Agree

2	Innovative TVET enhances programming and coding skills.	3.33	0.79	Agree
3	Students acquire data management skills through TVET programmes.	3.27	0.81	Agree
4	Innovative TVET strengthens cybersecurity awareness.	3.20	0.85	Agree
5	Students develop problem-solving skills using digital tools.	3.48	0.72	Agree
6	TVET enhances students' digital communication skills.	3.39	0.76	Agree
7	Students gain cloud computing knowledge through TVET.	3.12	0.88	Agree
8	Innovative TVET promotes creativity and innovation.	3.44	0.70	Agree
9	Students become proficient in technology-driven collaboration.	3.36	0.75	Agree
10	TVET improves students' adaptability to digital environments.	3.41	0.73	Agree
11	Students acquire artificial intelligence-related skills.	3.08	0.91	Agree
12	TVET improves employability through digital competence.	3.55	0.65	Agree
13	Students develop digital entrepreneurship skills.	3.31	0.80	Agree
14	Innovative TVET supports lifelong digital learning.	3.38	0.77	Agree
Cluster Mean		3.34	0.77	Agree

The findings in Table 2 indicate a cluster mean of 3.34, showing that respondents agreed that innovative TVET significantly influences students' acquisition of advanced digital competencies in universities in River State. The results suggest that innovative TVET contributes substantially to the development of digital literacy, programming, cybersecurity, digital communication, entrepreneurship, and other contemporary digital skills needed for employment and productivity.

Research Question 3: Identify the challenges and opportunities associated with harnessing innovative TVET for advanced digital acquisition in universities in River State.

Table 1: Mean rating and Standard Deviation of Responses on challenges and opportunities associated with harnessing innovative TVET for advanced digital acquisition in universities in River State.

S/N	Item statement	($\bar{X}$)	SD	Remark
1	Inadequate funding affects digital skill acquisition programmes.	3.56	0.67	Agree
2	Insufficient digital infrastructure limits effective TVET implementation.	3.61	0.63	Agree
3	Poor internet connectivity hinders digital learning.	3.49	0.71	Agree
4	Lack of modern equipment affects practical digital training.	3.58	0.66	Agree
5	Shortage of qualified digital instructors affects programme quality.	3.37	0.80	Agree
6	Industry partnerships can improve digital skills acquisition.	3.52	0.69	Agree
7	Government support can enhance innovative TVET implementation.	3.63	0.62	Agree
8	Digital innovation hubs can improve students' competencies.	3.42	0.75	Agree

9	Curriculum modernization can enhance digital acquisition.	3.46	0.73	Agree
10	Professional development programmes can improve instructors' effectiveness.	3.40	0.78	Agree
11	Private sector collaboration can provide digital training opportunities.	3.35	0.82	Agree
12	Access to digital learning resources can improve learning outcomes.	3.54	0.68	Agree
13	Technological innovation presents opportunities for skills development.	3.57	0.65	Agree
14	Digital inclusion initiatives can improve students' participation.	3.31	0.84	Agree
15	Effective policy implementation can strengthen innovative TVET.	3.60	0.64	Agree
Cluster Mean		3.49	0.71	Agree

The results in Table 3 show a cluster mean of 3.49, indicating agreement among respondents that both challenges and opportunities exist in harnessing innovative TVET for advanced digital acquisition in universities in River State. Major challenges identified include inadequate funding, poor infrastructure, insufficient equipment, and shortage of qualified personnel, while opportunities include government support, industry collaboration, curriculum modernization, digital innovation hubs, and technological advancement. These findings suggest that addressing the identified challenges and leveraging available opportunities will significantly enhance advanced digital skills acquisition among university students.

Discussion

The findings in Table 1 revealed a cluster mean of 3.24, indicating that innovative TVET practices are integrated into teaching and learning processes for advanced digital skills acquisition in universities in River State. This finding suggests that universities are increasingly adopting digital learning platforms, virtual laboratories, learning management systems, digital assessment tools, and technology-based instructional approaches to enhance students' acquisition of contemporary digital competencies. This finding is in agreement with UNESCO (2023), who reported that the integration of digital technologies into TVET programmes enhances learners' access to practical skills, promotes technology-based learning, and prepares students for participation in the digital economy. UNESCO emphasized that institutions that successfully integrate digital learning tools and innovative instructional technologies provide learners with opportunities to acquire industry-relevant competencies. This aligns with the present finding, which revealed that innovative TVET practices are substantially integrated into university teaching and learning processes. Similarly, the finding corroborates the study of Parua and Yang (2024), who found that digital transformation, has become a major driver of TVET development worldwide. According to the authors, institutions that integrate smart technologies, virtual learning environments, and digital innovation platforms into educational programmes record improved learning outcomes and enhanced student preparedness for digital workplaces. Their findings align with the present study, which established that universities in Enugu State are integrating innovative TVET approaches to support advanced digital acquisition. The result also agrees with Okolie, Nwajiuba, Binuomote, Ehiobuche, Igu and Ajoke (2022), who observed that the adoption of technology-driven TVET practices improves students' practical competencies and

employability skills. The authors maintained that the integration of digital tools into vocational education contributes significantly to workforce readiness and technological adaptability among graduates. This finding aligns with the present study, which found that innovative TVET practices are being utilized to facilitate advanced digital skills acquisition among university students.

The findings in Table 2 showed a cluster mean of 3.34, indicating that innovative TVET significantly influences students' acquisition of advanced digital competencies in universities in River State. The result implies that innovative TVET contributes to the development of digital literacy, programming skills, cybersecurity awareness, cloud computing knowledge, digital communication, problem-solving abilities, and technology-based entrepreneurship competencies among students. The finding supports the position of UNESCO-UNEVOC (2024), which asserted that innovative TVET plays a critical role in equipping learners with future-oriented digital competencies necessary for the twenty-first-century workplace. According to UNESCO-UNEVOC, digitalized TVET programmes promote innovation, creativity, adaptability, and lifelong learning among students. This finding aligns with the present study, which revealed that innovative TVET has a positive influence on students' acquisition of advanced digital competencies. The present finding is also consistent with the study conducted by World Bank (2023), which reported that digital skills training programmes significantly improve learners' employability, productivity, and capacity to adapt to changing technological environments. The World Bank noted that institutions that integrate innovative vocational training methods produce graduates who possess stronger digital competencies than those exposed solely to traditional teaching methods. This finding aligns with the current study, which established that innovative TVET enhances students' acquisition of advanced digital skills. Furthermore, the finding agrees with Adeyemi and Adewale (2023), who found that technology-enhanced TVET programmes contribute significantly to the development of students' digital literacy, technological competence, and entrepreneurial skills. The authors observed that students exposed to innovative vocational training approaches demonstrate greater proficiency in the use of digital technologies and workplace applications. This finding aligns with the present study, which indicated that innovative TVET positively influences the acquisition of advanced digital competencies among university students in River State.

The findings in Table 3 yielded a cluster mean of 3.49, indicating that respondents agreed that both challenges and opportunities exist in harnessing innovative TVET for advanced digital acquisition in universities in River State. The findings identified inadequate funding, poor digital infrastructure, insufficient equipment, inadequate internet connectivity, and shortage of qualified personnel as major challenges. However, opportunities such as government support, industry partnerships, curriculum modernization, digital innovation hubs, and technological advancements were also identified. This finding is consistent with UNESCO (2024), which reported that inadequate infrastructure, insufficient funding, and limited technological resources remain major barriers to effective digital transformation in TVET institutions, particularly in developing countries. UNESCO further noted that strategic investments in infrastructure, policy implementation, and capacity building create opportunities for strengthening digital skills acquisition. This finding aligns with the present study, which identified both challenges and opportunities associated with innovative TVET implementation. The finding also agrees with African Development Bank (AfDB, 2023), which found that weak digital infrastructure and inadequate institutional capacity constitute major obstacles to

digital skills development across African higher education institutions. The report further indicated that partnerships between governments, industries, and educational institutions provide significant opportunities for improving digital training and workforce development. This aligns with the present study, which highlighted industry collaboration and government support as important opportunities for enhancing innovative TVET in universities. Similarly, the result corroborates the findings of Akinyemi and Odugbesan (2024), who observed that successful implementation of innovative TVET programmes depends on adequate funding, curriculum modernization, access to modern technological equipment, and continuous professional development of instructors. The authors further emphasized that emerging technologies and private-sector partnerships offer considerable opportunities for improving digital competencies among students. Their findings align with the present study, which identified both institutional challenges and developmental opportunities in harnessing innovative TVET for advanced digital acquisition in universities in River State.

Conclusion

Based on the findings of the study, it was concluded that innovative Technical and Vocational Education and Training (TVET) plays a significant role in promoting advanced digital acquisition among university students in River State. The study established that innovative TVET practices such as digital learning platforms, virtual laboratories, smart technologies, and technology-based instructional approaches are considerably integrated into university teaching and learning processes. The findings further revealed that innovative TVET positively influences students' acquisition of advanced digital competencies, including digital literacy, programming, cybersecurity, digital communication, and entrepreneurial skills required in the contemporary digital economy. However, the study also identified challenges such as inadequate funding, insufficient digital infrastructure, shortage of qualified personnel, and limited access to modern technological equipment, while highlighting opportunities such as government support, industry partnerships, curriculum modernization, and technological innovation. Therefore, the effective harnessing of innovative TVET remains a viable strategy for enhancing digital competence, employability, innovation, and workforce readiness among university graduates in River State.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. University administrators and relevant educational authorities should strengthen the integration of innovative TVET practices into teaching and learning by providing modern digital infrastructure, virtual laboratories, smart classrooms, learning management systems, and other technology-driven instructional facilities that will enhance advanced digital skills acquisition among students.
2. Universities should establish stronger collaborations with industries, technology firms, and professional organizations to facilitate practical training, internships, mentorship programmes, and exposure to emerging digital technologies that will further improve students' acquisition of advanced digital competencies and employability skills.
3. Government agencies, university management, and other stakeholders should increase funding for innovative TVET programmes, support continuous professional development for instructors, and ensure regular curriculum review to align university training with current technological trends and labour market demands in the digital economy.

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