# Influence of AI-Powered Adaptive Learning Systems on Business and Entrepreneurial Competencies' Development Amongst Students in TVET in University of Nigeria, Nsukka

**by**

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**Abstract**

*This study ascertained the influence of AI-powered adaptive learning systems on business and entrepreneurial competencies' development amongst TVET students in University of Nigeria, Nsukka. AI-powered systems design person-specific educational experiences for learners to effectively engage yet, some tertiary education institutions have remained fixated in delivering instruction through traditional approaches. Inefficiency of such approaches result in inability to personalize learners' needs. Three null hypotheses were postulated and tested at 0.05 significance level. Related literatures were reviewed. Descriptive survey design was adopted. Population of the study consisted of 98 vocational educators and was entirely studied.16-item questionnaire was used for data collection. Reliability coefficient of the instrument was 0.87. Linear regression was used to test hypotheses. Findings showed significant influence of AI-powered business simulation games, mentorship platforms; and virtual business incubators on business and entrepreneurial competencies' development. It was recommended that students should upskill themselves to use AI-powered learning gadgets; vocational educators should be retrained on use of AI-powered business simulation games, mentorship platforms; and virtual business incubators; curriculum developers should make provision for integration of AI-powered systems as instructional approaches; and Federal and State Ministries of education should improve budgetary allocations and ensure timely disbursements of funds for effective programme implementation.*

***Keywords:*** Artificial Intelligence, Adaptive learning systems, Business simulation games, Mentorship platforms, Virtual business incubators.

## Introduction

Artificial intelligence (AI)-powered adaptive learning systems are changing the narrative for business and entrepreneurial competency development by cultivating personalized learning experiences that addresses individual concerns and needs. These adaptive learning systems, through data analytics, can highlight knowledge gaps and suggest person-specific resources, thus facilitating the overall effectiveness and efficiency of educational programmes. Additionally, the integration of AI brings about continuous improvement in structured learning modules, impacting on desired outcomes and, making the instructional modules more responsive to the dynamic nature of business and entrepreneurship environment. AI-powered adaptive learning system practically aligns learning content and instructional methods based on a learner's individual needs, abilities, and progress.

AI is the capability of machines to execute tasks that usually require human

intelligence to perform like learning, reasoning, problem-solving, and decision-making.AI is a field of computer science which handles the development of intelligent computer operational systems with the capability to perceive, analyze, and respond accordingly to inputs measures (Spector, 2006, Kamble & Shah, 2018). AI is a way of making a computer, a computer-controlled robot, or a software to function intelligently, in the similar manner human intelligence function or operate (NACOS ADSU, 2025). The goals of AI are to create expert systems that exhibit intelligent behaviour, learn, demonstrate, explain, and advice its users for operational efficiency; and to implement human intelligence in machines that creates systems that understand, think, learn, and behave like humans in critical ramifications (Tutorials Points, 2025). AI is currently applied to adaptive learning system to facilitate delivery of personalized learning experiences. Adaptive learning is a unique teaching technique which embodies the full range of experiences gained by students. Kasinathan et al. (2017) stated that adaptive learning (AL) involves personalizing the learning environment and instructional materials based on students' behaviours, ability, and interest, while closely assessing their performance, progress and comprehension.AL refers to technologies that uniquely adjust to accommodate instructional level or type of instructional content according to an individual's abilities or skill attainment, in such a manner that maximally accelerate a learner's performance with both automated and instructor interventions (Capuano & Caballé, 2020). This is achieved through the instrumentality of adaptive learning systems.

An adaptive learning system (ALS) is meant to offer person-specific learning resource for learners, especially learning content and user-preferred interfaces for processing their learning according to their abilities (Aroyo et al., 2006). ALSs are new, creative and flexible educational tools that adjust to meet each student's unique abilities, speed, and learning preferences (Kinshuk et al, 2025). The goal of adaptive learning systems is to create a more person-specific learning encounter by redesigning the content and teaching approaches based on how well a learner is doing at any given time. This level of customization can enable students to learn faster and achieve better results.

AI-powered adaptive learning system therefore, is an educational tool that leverages artificial intelligence to personalize the learning experience for each student based on their abilities and peculiarities. It uses artificial intelligence to tailor the learning experience to individual students, adjusting content, pace, and feedback based on their unique needs and performance. AI-powered adaptive learning systems manifest in various forms including business simulation games, mentorship platforms, and virtual business incubators.

Business simulation games (BSGs) are engaging and personalized learning experiences that help people (students) to run a virtual business, make strategic choices, and compete with others without any real-world risks (Schröder & Liviu, 2015). BSGs are based on a model containing complex interactions between and among constituent elements of a system in a prescribed sequence of related events (De La Torre et al., 2021). BSGs are experiential learning tools that prompt students to appreciate, explore and understand business processes in a safe, realistic or real-life situation, and immersive environment (Faisal, Chadhar, et al., 2022). BSGs are often utilized in business and entrepreneurship education and corporate training to improve skills and knowledge.

Virtual mentorship (E-mentorship) is a situation where mentors and protégés interact with each other through the instrumentality of web-facilitated tools such as email, online discussion groups, instant messaging, chats, video conferencing, skype, blogs, wikis and document sharing (Purcell, 2004). E-mentoring

guarantees a number of benefits such as improvement in the quality of communication and simultaneous access to more than one mentor or mentee at a time thereby expanding learning outreach and instructional networks (An & Lipscomb, 2010). Mentorship platforms on the other hand, are online teaching-learning resources that help bring mentors and mentees together (Iqbal, 2020). These platforms offer features for interaction, communication, resources sharing, and managing programmes. Mentorship platforms are accessible through the web or mobile devices and are useful in many areas, including business and entrepreneurship education, business career growth, and support for boarding entrepreneurs.

Finally, a business incubator is a service provider that offers a comprehensive package of services for the support, facilitation and acceleration of the growth of a new business (Abraham & Knight, 2020).A virtual business incubator performs these functions with services and tools that are technology-empowered and at least, to a significant extent, independent of the location of the service provider and/or the users of these services. Hence, Aerts et al. (2007) stated that virtual business incubators are e-platforms that offer evolving processes to develop people and business enterprises. A virtual business incubator supports potential and existing entrepreneurs with managerial skills building, financial support, technical competence, and facilitates the connection of them to new environments and a wide commercial network to grow in. These AI-powered adaptive learning systems impact business and entrepreneurship competencies development.

Entrepreneurial and business competencies are the foundational skills, functional knowledge, and innovative and creative values that assist individuals and business enterprises to successfully initiate, start, manage, and grow business ventures(Pepple& Enuoh, 2020). Entrepreneurial and business competencies cover inherent characteristics that lead to the creation of new ventures and encompass creativity, initiative, problem-solving, resource management, and financial and technological knowledge (Agbor et al., 2023). The development of productive skills and competencies is championed by technical and vocational education and training (TVET).

TVET is used as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (FGN, 2014). TVET strives to empower individuals with the practical or demonstrable skills and essential knowledge needed to function in various trades, occupations and industries (UNESCO-UNEVOC, 2025). It emphasizes hands-on or theory-to-practice training and industry knowledge-relevant curricula to prepare people that would acquire industry skills for seamless transition to the job market. Contextually, TVET is used holistically to represent educational experiences that involve general education, technologies and related sciences and the acquisition of hands-on skills, attitudes, understanding and knowledge that are specific to occupations in various sectors of economic and social life.

Through their TVET programmes, universities are developing skills to bridge skills shortages in the industry. Higher Education Committee (2019) posited that university is a higher educational institution offering a range of registered undergraduate and graduate curricula.In universities and other research institutions, scholars conduct research studies to advance knowledge and proffer solutions to societal problems. Goetze (2019) explained that the university is conceived primarily in terms of the economic value it creates in relation to preparation of students for

the workforce, production of innovative technologies, incubating entrepreneurial projects, and producing scientific discoveries that are useful to government or industry in development. Contextually, a university is a tertiary institution of learning where advanced teaching and learning is effectuated, and research aimed at advancing the frontiers of knowledge is conducted in order to solve societal problems.

In the subject-matter of this study, recent research studies have focused on artificial intelligence and adaptive learning. For instance, Barišić and Prović (2014) conducted a study on "Business simulation as a tool for entrepreneurial learning: The role of business simulation in entrepreneurship education" to explore levels of digital and entrepreneurial competencies before and after training and competition using business simulation games as a tool. The results showed that the level of students' digital and entrepreneurial competencies cumulatively grew by about 10% and that students' competencies have been increased even more (20%). Mustata et al. (2017) carried out a study on "developing competencies with the general management II business simulation game." It was found in the study that there is a positive impact of students' General Management II (GM2) on development of management-related competencies amongst students and trainees.

Wang et al. (2020) carried out an investigation to compare the learning impacts of individualized adaptive learning courseware to two common instructional approaches in China - large-group and small-group classroom instruction. It was discovered that Chinese eighth-grade students from two provinces randomly assigned to use Squirrel AI Learning showed greater gains on a mathematics test than those randomly assigned to whole-class or small-group instruction led by expert teachers. Morze et al. (2021) also conducted a study on implementation of adaptive learning at higher education institutions by means of Moodle LMS. In the study, participants agreed that they benefit from the possibility to gain knowledge regardless of time, location and device they use and that that they lack personalization both of materials and studying process, limited in terms of fulfillment and would like to have a choice of the level of study. Again, Lall et al. (2022) conducted a study on "digital platforms and entrepreneurial support: a field experiment in online mentoring." It was found that showing entrepreneurs a video of a successful mentor-mentee relationship increases the chances that they will reach out to a potential mentor but does not improve their chances of making a connection. Nate et al. (2022) equally conducted a study on "fostering entrepreneurial ecosystems through the stimulation and mentorship of new entrepreneurs." It was found that the mentoring programme for new entrepreneurs increased their self-confidence, especially for young people as it taught them how to run a company without outside interference, and significantly transformed the mentality of the participants in the experiment.

More so, Lim et al. (2023) carried out a study on efficacy of an adaptive learning system on course scores. It was found that there is merit in using the in-house adaptive learning system, though the difference did not present statistically significant differences at the 95% confidence level. Sutrisno et al. (2024) also carried out a study on "the role of business incubators in enhancing human resource competence and encouraging entrepreneurship among young people." The study found that business incubators play a central role in developing and accelerating the growth and success of startup companies in Indonesia, especially among young people. Sari et al. (2024) equally conducted a study to examine the impact of AI-powered adaptive learning systems on educational outcomes across diverse settings using a mixed-methods

approach. It was found that Smart Sparrow and IBM Watson Education as AI tools, demonstrated higher course completion rates and increased student engagement. Comparative analysis further confirmed the superior effectiveness of adaptive systems over traditional methods. Similarly, Andhika et al. (2024) investigated the effectiveness of adaptive learning systems integrated with LMS in higher education. The general purpose of this study was to determine how well ALS combined with LMS can raise student engagement, academic achievement, and general satisfaction in higher education environments. It was found that students appreciated the personalized learning paths and timely feedback provided by the ALS, reporting increased motivation and satisfaction with their learning experience. The integration of adaptive learning systems within LMS platforms demonstrates a positive impact on student academic performance, engagement, and satisfaction in higher education. However, these studies did not consider the influence of AI-powered adaptive business simulation games, mentorship platforms; and virtual business incubators on business and entrepreneurial competencies development.

The lack of empirical studies on adaptive learning systems with focus on AI-powered adaptive business simulation games, mentorship platforms; and virtual business incubators sub-variables viz-a-viz business and entrepreneurial competencies development highlight the research insufficiency in the area in spite of the incessant practical problem of underdevelopment of business and entrepreneurial competencies amongst students through traditional means of instruction in tertiary institutions of learning. This problem may result to limited economic growth, increased graduate unemployment, productive and service inefficiency and waste, poor resistance to change, social inequality, lower competitiveness in the market, stagnation of creative and innovative effort, etc. It is against this background that this study was designed to ascertain the influence of AI-powered adaptive learning systems of business and entrepreneurship competencies development amongst students in TVET education in university of Nigeria, Nsukka.

## Statement of the Problem

Applied in business and entrepreneurship education and training, AI-powered adaptive learning systems can be uniquely impactful. These systems design person-specific educational experiences to individual learners' needs, preferences, and proficiency levels thereby making students engage more effectively. Adaptive learning platforms also have the efficacy to generate automated immediate feedback, allowing learners to understand their mistakes and improve promptly. Through the identification of areas of students' needs, these platforms help educators allocate limited resources more effectively to ensure that time and effort are focused where they are most needed thereby enhancing the learning process. AI-powered systems can equally serve large numbers of learners simultaneously. This makes quality education more available and accessible across different demographics and geographical locations.

Unfortunately, the vast majority of tertiary education institutions have remained fixated in delivering instructional content through the traditional education system, which focuses on "one-size-fits-all" teaching methods. Such a methodology has been proven to be inefficient since each student has a special way of learning and comprehending (Wang et al., 2020). The inefficiencies associated with the traditional education system such as inability to tailor educational experiences to individual learners' needs, inability to provide immediate feedback, allowing learners to immediately understand their mistakes and improve promptly, inability to attend to large numbers of learners

simultaneously, in ability to boost student engagement and motivation for the enjoyment of learning experience, etc. may lead to underdevelopment of Business and entrepreneurial competencies in students.

Business and entrepreneurial competencies underdevelopment is significantly consequential. Weak business and entrepreneurial skills may expose graduates and enterprises to difficulty in innovating and creating new goods or services with the potential to stifle economic growth and job creation in rural areas. A lack of business and entrepreneurial skills would result in lesser startups and few small businesses expansion, leading to limited job opportunities and staggering unemployment rates. Where students lack access to business and entrepreneurial education and training, it can possibly degenerate to social inequities and limit access to economic resources and opportunities.It is against this background that this study was designed to ascertain the influence of AI-powered adaptive learning systems of business and entrepreneurship competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Purpose of the Study**

The general purpose of the study is to ascertain the influence of AI-powered adaptive learning systems on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka. Specifically, the study sought to ascertain the influence of:

1. AI-powered adaptive business simulation games on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.
2. AI-driven mentorship platforms on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.
3. AI-powered virtual business incubators on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Hypotheses**

The following null hypotheses were postulated for the study and tested at 0.05 level of significance:

1. AI-powered adaptive business simulation games have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.
2. driven mentorship platforms have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.
3. AI-powered virtual business incubators have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Methodology**

This study adopted descriptive survey design. A descriptive survey is that research design used to describe the characteristics of a population, situation, or phenomenon methodologically (Librarianship Studies and Information Technology, 2022). It focuses on "what" exists rather than "why" something exists, aiming to provide a detailed picture of the current state.The study was conducted in University of Nigeria, Nsukka (UNN). The population for the study was98vocational educators in Faculty of Vocational and Technical Education (VTE) of UNN. These set of Lecturers were used as the subjects of the population and units of data collection for this study because of their participation in the teaching of business and entrepreneurship courses to the students. Therefore, they are in a position to provide the necessary opinions on

the problem of this study. The study was a census study since the entire population was studied due to its manageability hence; no sample was drawn. Researchers-constructed questionnaire with response options of 5-points consisting of 16questionnaire items was used for data collection.

The questionnaire was divided into two parts - I and II.Part I was designed to seek information on the Biographical characteristics (Bio-data/Background) of the respondents. The part contained three items numbered a – c. Part II was further sub-divided into three sections (A-C) according to the specific purposes of the study and structured on five response options of Very High Influence (VHI), High Influence (HI), Moderate Influence (MI), Low Influence (LI), and Very Low Influence (VLI). Section A contained five item statements (1-5) designed to elicit data on the influence of AI-powered adaptive business simulation games on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka. Section B contained six item statements (6-11) designed to gather data on the influence of AI-driven mentorship platforms on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka. Finally, Section C contained five item statements (12-16) designed to obtain data on the influence of AI-powered virtual business incubators on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

The instrument was face-validated by five experts from Department of Vocational and Entrepreneurship Education and Department of Business Education, Faculty of VTE of UNN teaching business and entrepreneurship education courses. The internal consistency of the instrument for data collection was determined using Cronbach Alpha reliability coefficient and the test yielded a coefficient value of 0.87. Ninety-eight (98) copies of the questionnaire were administered to the respondents by the researchers. Out of the 98 copies administered 91 were retrieved making a return rate of 93%.Data collected for this study were analyzed using linear regression analysis and the null hypotheses weretestedat 0.05 level of significance.

**Results**

**Hypothesis One**

AI-powered adaptive business simulation games have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Table 1**

Regression ANOVA test of significance of how AI-powered adaptive business simulation games influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka

| Model | | Sum of Squares | Df | Mean Square | F | Sig | |
|---|---|---|---|---|---|---|---|
| 1 | Regression | 7.321 | 1 | 7.321 | 131.238 | .000[b] | Residual |
| | 12.364 | 89 | .056 | | | | |
| | Total | 19.685 | 90 | | | | |

a. Dependent Variable: Business and Entrepreneurial Competencies Development (BECD)
b. Predictors: (Constant), AI-powered Adaptive Business Simulation Games (APABSG)
$\alpha = 0.05$

Result in Table 1 reveals that AI-powered adaptive business simulation games significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka, ($F(1, 89)$ =

131.238, *Sig.* = .000). This is because the associated probability (sig.) value of .000 when compared with 0.05 level of significance used in hypothesis one testing is found to be significant since .000 is less than 0.05 ($p$ <.05). Null hypothesis one ($Ho_1$) is therefore rejected. Inferentially, AI-powered adaptive business simulation games significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Hypothesis Two**

AI-driven mentorship platforms have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Table 2**

Regression ANOVA test of significance of how AI-driven mentorship platforms influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka

| Model | | Sum of Squares | Df | Mean Square | F | Sig |
|---|---|---|---|---|---|---|
| 1 | Regression | 8.742 | 1 | 8.742 | 143.252 | .000[b] |
| | Residual | 13.243 | 89 | .061 | | |
| | Total | 21.985 | 90 | | | |

a. Dependent Variable: Business and Entrepreneurial Competencies Development (BECD)
b. Predictors: (Constant), AI-Driven Mentorship Platforms (ADMP)
α = 0.05

Result in Table 2 reveals that AI-driven mentorship platforms significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka, ($F$(1, 89) = 143.252, *Sig.* = .000). This is because the associated probability (sig.) value of .000 when compared with 0.05 level of significance used in hypothesis two testing is found to be significant since .000 is less than 0.05 ($p$ <.05). Null hypothesis two ($Ho_2$) is therefore rejected.From the inference drawn, AI-driven mentorship platforms significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Hypothesis Three**

AI-powered virtual business incubators have no significant influence on business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Table 3**

**RegressionANOVA test of significance of how AI-powered virtual business incubators influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka**

| Model | | Sum of Squares | Df | Mean Square | F | Sig |
|---|---|---|---|---|---|---|
| 1 | Regression | 10.851 | 1 | 10.851 | 202.164 | .000[b] |
| | Residual | 12.111 | 89 | .054 | | |
| | Total | 22.962 | 90 | | | |

a. Dependent Variable: Business and Entrepreneurial Competencies Development (BECD)
b. Predictors: (Constant), AI-Powered Virtual Business Incubators (APVBI)
α = 0.05

Result in Table 3 reveals that AI-powered virtual business incubators significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka, ($F(1, 89) = 202.164$, $Sig. = .000$). This is because the associated probability (sig.) value of .000 when compared with 0.05 level of significance used in hypothesis three testing is found to be significant since .000 is less than 0.05 ($p < .05$). Null hypothesis three ($Ho_3$) is therefore rejected. Inferentially, AI-powered virtual business incubators significantly influence business and entrepreneurial competencies development amongst students in TVET education in university of Nigeria, Nsukka.

**Discussion of Findings**

There are three principal findings from this study. Firstly, AI-powered adaptive business simulation games significantly influence business and entrepreneurial competencies development. Secondly, AI-driven mentorship platforms significantly influence business and entrepreneurial competencies development. Finally, AI-powered virtual business incubators significantly influence business and entrepreneurial competencies development. The significance of these results is that the use of AI-powered adaptive business simulation games, AI-driven mentorship platforms, and AI-powered virtual business incubators in business and entrepreneurship education would facilitate the development of students' competencies to start, run and manage entrepreneurial ventures. These findings relate to the research question of this study because they provide answers as to whether AI-powered adaptive learning systems can bring about competencies development in business and entrepreneurship education.

This pattern of results is consistent with previous literature which established that students' level of digital and entrepreneurial competencies cumulatively grew by about 10% and that students' competencies have been increased even more (20%) through exposure to online business games (Barišić & Prović, 2014); positive impact of students' General Management II (GM2) on development of management-related competencies amongst students and trainees because of business simulation game (Mustata et al., 2017); and showing entrepreneurs a video of a successful mentor-mentee relationship increases the chances that they will reach out to a potential mentor but does not improve their chances of making a connection (Lall et al.,2022). Previous studies also revealed that simulation and mentoring programme for new entrepreneurs increased their self-confidence, especially for young people as it taught them how to run a company without outside interference, and significantly transformed the mentality of the participants in the experiment (Nate et al., 2022); and incubators play a central role in developing and accelerating the growth and success of startup companies in Indonesia, especially among young people (Sutrisno et al., 2024).

Our findings highlight the critical role of AI-powered adaptive learning systems - business simulation games, mentorship platforms; and virtual business incubators in business and entrepreneurial competencies development. This is empirical evidence that reveals the need to transit from traditional face-to-face instructional approaches to online, personalized instructional delivery in developing business and entrepreneurial competencies.

One limitation of this study is that the smallness of the population of the study resulting from inadequate manpower of vocational educators in the study area. This would affect the wider generalizability of the findings of the study. In spite of this limitation, these results have some potential intervention implications. For example, there is need for vocational technical education

students of UNN to upskill themselves in the area of technology tools utilization for learning. The vocational educators of UNN need to be retrained on the instructional protocol required for integration of AI-powered adaptive learning systems. Curriculum planners should make adequate provision for incorporation of AI-powered adaptive learning systems into vocational education curriculum.

In terms of future research, it would be useful to extend the current findings by examining the moderating effect of gender on the influence of AI-powered business simulation games, mentorship platforms; and virtual business incubators on business and entrepreneurial competencies development. Despite the limitation associated with this study, the study has enhanced our understanding of the influence of AI-powered business simulation games, mentorship platforms; and virtual business incubators on the development of business and entrepreneurial competencies. We hope that the current research will stimulate further investigation of this important area.

## Conclusion and Recommendations

The study sought to ascertain the influence of AI-powered adaptive learning systems - business simulation games, mentorship platforms; and virtual business incubators on the development of business and entrepreneurial competencies. The results revealed significant influences. This result implies upskilling of students on the use of AI digital tools, retraining of vocational educators on the utilization of AI-powered adaptive learning systems to develop business and entrepreneurial competencies amongst students; and integration of AI-powered business simulation games, mentorship platforms; and virtual business incubators in business and entrepreneurship education curriculum. It also implies need for improved budgetary provision and releases for the funding of business and entrepreneurship education, etc.

Based on the findings of this study, it is recommended that:

1. Business and entrepreneurship education students should upskill themselves on the utilization of AI-powered gadgets for learning.
2. Vocational educators teaching business and entrepreneurship education should be retrained on the use of AI-powered adaptive learning systems particularly, business simulation games, mentorship platforms; and virtual business incubators.
3. Curriculum developers should make provision for the integration of AI-powered business simulation games, mentorship platforms; and virtual business incubators as instructional approaches for delivering instruction in business and entrepreneurship education.
4. Federal and States Ministries of education should improve the budgetary allocations for vocational technical education and also ensure timely disbursements of allocated funds for effective implementation of business and entrepreneurship education programmes under TVET.

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