Utilization of Artificial Intelligence Powered tools in Enhancing Undergraduate Students' Entrepreneurial Skills Amidst Economic Downturn in Nigeria

[1]Sunday, E. S., [2]Umanah, F. I., [3]Abasi, A. U. & [4]Joseph, R. E.

[1, 2, 3, 4] Department of Science Education
Akwa Ibom State University
Mkpat Enin, Nigeria

Abstract
In today's 21st-century learning environment, educational technology serves as a key tool for fostering innovation and entrepreneurship, particularly in developing economies. The study investigated on the utilization of artificial intelligence **(**AI) in enhancing undergraduate students' entrepreneurial skills amidst Nigeria's economic downturn. The population of the study consisted of 257 400 level students comprising the five programme (Biology, Chemistry, Integrated Science and Mathematics) in Science Education Department, Faculty of Education, Akwa Ibom State University. A descriptive survey research design was adopted for the study and data were gathered from 168 students using an instrument tagged: Utilization of AI on Students' Entrepreneurial Skills Questionnaire (UAISESQ). The instrument was presented to an Entrepreneurial Studies expert and an expert in Measurement and Evaluation in Akwa Ibom State University for content validation. The reliability of the instrument was determined using the Cronbach Alpha and the reliability coefficient obtained was 0.86.The data collected were analyze using mean, standard deviation and independent t-test. The findings indicated a moderate level of AI tools utilization for entrepreneurial skill development in Akwa Ibom State University despite economic challenges. Furthermore, there is no significant difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development. The study concluded that educational institutions should incorporate AI literacy into their curriculum to ensure that students are proficient in using AI tools. This will not only enhance their academic performance but also equip them with the digital skills necessary for entrepreneurial ventures in the modern economy.

Keywords: Artificial Intelligence, entrepreneurial skills, economic downturn, gender**.**

Introduction

Beyond the realm of education, the influence of 21st century technology on the employment landscape has transformed job roles, created new industries, and necessitated the continuous up skilling of the workforce. Automation and artificial intelligence (AI) have streamlined processes and improved efficiency, but they have also displaced traditional jobs, leading to demands for workers who are adept at using advanced technologies. The integration of artificial intelligence (AI) in education has ushered in a new era of personalized and efficient learning, enabling educators and students to transcend traditional learning boundaries (Kumar & Sharma, 2023). The delivery, accessibility, and evaluation of educational content are being transformed by AI-powered technologies, which present new chances to improve administrative, instructional, and learning effectiveness (Al-Ansari &Al-Qallaf, 2020).

The utilization of AI tools like ChatGPT, Khanmigo, and Quizlet AI has proven to be transformative in enhancing students' entrepreneurial skills development. These tools, leveraging natural language processing and machine learning, provide personalized learning experiences, automate routine educational tasks, and offer data-driven insights to improve decision-making (Kumar & Sharma, 2023). Such technologies foster innovation, adaptability, and critical thinking—key skills for entrepreneurship in the modern economy. Through real-time tutoring and the generation of customized study materials, these AI tools empower students to analyze complex problems and develop innovative solutions (Patel & Singh, 2022). Problem-solving abilities are fundamental to entrepreneurial success, as they enable learners to navigate challenges and seize opportunities effectively.

Engaging with AI platforms also improves digital literacy, which is an essential ability for navigating technologically advanced industries and taking advantage of opportunities in them. For example, students can participate in data-driven decision-making, which is essential for strategic planning in entrepreneurship, thanks to AI-driven insights about user behavior and performance (Nwankwo & Akpan, 2023). Additionally, because AI-powered education is inclusive, students from a variety of backgrounds can access top-notch resources, which lessen inequalities and foster equitable skill development (UNESCO, 2022).The Sustainable Development Goal 4 (SDG4) of the UN, which prioritizes inclusive and equitable high-quality education for all, is directly aligned with these developments. By utilization of AI, students get the imaginative, analytical, and practical skills needed for entrepreneurship, which eventually promotes sustainable development and economic empowerment. The need for students' development in using digital resources as a means to bridge the knowledge gab in learning is to be emphasized in these modern times (Udofia, Akpan & Sambo, 2025). Similarly, technology and innovation have brought tremendous change in the way the students learn; with a global network, newer avenues are created. Nathan, Abasi and Isuaiko (2025) also opines that the involvement of artificial intelligence as a digital resource in research activities marks a transformative era for data collection. By exploring strategic steps to enhance data acquisition processes, students/researchers can leverage AI's potential to unlock new possibilities, address existing limitations, and contribute to the advancement of knowledge across various disciplines.

The advent of the AI as a digital tool has necessitated educational systems worldwide to incorporate technology to enhance learning outcomes, particularly entrepreneurial skills. As economies evolve and technological integration accelerates, students must be equipped with skills to innovate and adapt to economic changes. In Nigeria, economic challenges such as high unemployment and inflation underscore the need for entrepreneurial education (Oyewumi, 2022). Integrating AI provides opportunities to bridge digital skills gaps by delivering practical, scalable, and dynamic learning experiences that foster entrepreneurial mindsets (Amadi & Oluwaseun, 2021). According to Akpan, Atabang and Udofia (2025), digital gap is a new form of social inequality derived from the unequal access to the new information communications technologies, by gender, territory, and social class. It referred to as digital divide, is the disparity between individuals, household, businesses and communities in terms of access to, use of or knowledge of digital technology, particularly access to modern information and communication technology. Digital knowledge gap is the disparity in individuals' ability to access, understand and effectively use digital technologies and information. For Nigeria, a country facing significant economic challenges, the development of entrepreneurial skills in its youth has become essential. Entrepreneurial skills enable young people to navigate economic challenges by equipping them with innovative solutions to real-world problems (Oseni, 2020). In this context, AI offers transformative potential for enhancing 21st-century learning. By bridging gaps in traditional educational systems, AI provides a flexible, inclusive platform for entrepreneurial skill development (Livingstone, 2015).

Entrepreneurial skills encompass a range of competencies, including critical thinking, creativity, problem-solving, and adaptability (Hisrich, Peters, & Shepherd, 2020). Entrepreneurial skills and acquisition in Nigeria is gaining momentum as a response to high youth unemployment and economic challenges. However, studies indicate that the current educational system often falls short in equipping students with the practical skills needed for the job market, let alone entrepreneurship (Babalola & Kemi, 2022). Integrating educational

technology could close this gap, but the extent of its effectiveness across diverse student demographics is under-researched.

In Nigeria, significant gender disparities in access to technological tools persist. Socio-cultural factors and economic barriers often hinder students' especially female folks from fully utilizing technology for learning and business. Studies show that while educational technology has the potential to empower many individuals, however, many females still face challenges that limit their engagement (Olatokun & Ojo, 2020). Okonkwo (2021) found that male students are more likely to engage with technology in learning environments, while female students may encounter societal barriers. Ngige (2021) found that girls have less exposure to digital tools and Educational Technology platforms than boys, often due to societal expectations and resource constraints. Conversely, Moffat, Thomas, & Umanah (2023) found no significant effect of gender among students exposed to media devices. Also, Sunday and Umanah (2022) found no difference between male and female students. However, with the contradictions and lack of a clear trend in the gender of students towards educational technology and entrepreneurial skills, initiatives aimed at increasing students' access to educational technology are crucial for mitigating these challenges and empowering more entrepreneurs to curb the suppressing economic downturn in Nigeria. Hence, this paper sought to investigate how AI-powered tools enhance entrepreneurial skills among undergraduate students, emphasizing the influence of factors such as AI tools utilization levels and gender. In particular, it explores how effective utilization of AI tools in Nigerian education can serve as a resilient response to economic downturns, ultimately aiming to prepare students to meet real-world challenges.

Statement of the Problem

Nigeria faces significant challenges with high youth unemployment rates and economic instability, which severely restrict job opportunities. Education alone does not suffice to prepare students for the workforce. Many educational systems rely on traditional teaching methods, which may not support the development of entrepreneurial skills essential for navigating a rapidly evolving job market. This mismatch between education and employability presents a pressing issue: without integrating AI tools effectively, students may lack the practical skills required for entrepreneurial success. Despite efforts to promote entrepreneurial education, challenges of entrepreneurial skills development persist among students. Researches abound in literature indicates that AI tools can aid in cultivating entrepreneurial abilities; however, there is lack of empirical data regarding the utilization of AI tools and gender differences among students in Nigeria as such, addressing these gaps is vital to ensure equitable and effective utilization of AI tools in entrepreneurial education. Hence, the aim of this study was to investigate on the utilization of AI powered toolsin enhancing undergraduate science education students' entrepreneurial skills amidst economic downturn in Nigeria.

Research Questions

1. To what extent do undergraduate science education students utilize AI powered tools in enhancing their entrepreneurial skills amidst the economic downturn?
2. What is the gender differences in the perceive utilization of AI powered tools for entrepreneurial skill development among undergraduate students?

Hypothesis

1. There is no significant difference between male and female students' perceive utilization of AI powered tools for entrepreneurial skill development.

Methods

The study adopted a descriptive survey design, focusing on quantitative methods to analyze how utilization of AI powered tools influence students' entrepreneurial skill development. The design is suitable for analyzing how different variables correlate within a specific population. The population of the study consisted of 257 level 400 students in the entire programme (Biology, Chemistry, Integrated Science, Mathematics and Physics) in Science Education Department, Faculty of Education, Akwa Ibom State University. The sample size of the study was 168 students randomly selected from the Department of Science Education Akwa Ibom State University. The instrument for data collection was Utilization of AI powered tools on Student Entrepreneurial Skills Questionnaire (UAISESQ).The instrument utilized a four-point Likert-Scale rating with response options: "Strongly Agree" (SA), "Agree" (A), "Disagree" (D), and "Strongly Disagree" (SD), with corresponding numerical values of 4, 3, 2, and 1, respectively for respondents to provide their ratings. An entrepreneurial studies lecturer and an expert in Measurement and Evaluation in Akwa Ibom State University were presented the instrument for content validation. Cronbach Alpha reliability coefficient was used to determine the reliability of the instrument that yielded reliability coefficients of 0.86. The study employed mean, standard deviation and independent t-test statistics as statistical measures to test the research questions and hypothesis. Following the coding of data, where responses were assigned their respective numerical equivalents, aggregate scores were computed by summing individual scores, culminating in a potential maximum score of 10. Subsequently, this total was divided by the number of response options (4), yielding an average score of 2.50. The items with mean scores between 1.00 to 1.49 were considered strongly disagreed. Items with mean scores between 1.50 to 2.49 was considered disagreed, items with means scores between 2.50 to 3.49 was considered agreed while items with mean scores between 3.50 to 4.49 was considered strongly agreed. Overall, any cluster mean below 2.5 was considered low, 2.5-3.49 was considered as moderate while 3.50 to 4.49 was considered as high.

Results

Research Question One: To what extent do undergraduate science education students utilize AI powered tools in enhancing their entrepreneurial skills amidst the economic downturn?

Table 1: Mean and standard deviation showing the extent of utilization of AI powered by undergraduate science education students (N=168)

S/N	ITEMS	Mean	SD	Decision
1	AI-powered platforms like ChatGPT help me gain entrepreneurial knowledge.	3.33	1.17	A
2	I use online AI-driven courses (e.g., Coursera, Khan Academy) to learn entrepreneurial skills.	3.35	0.89	A
3	Tools like Grammarly assist me in creating professional business documents.	3.22	1.05	A
4	AI-powered study assistants (e.g., Quizlet) enhance my understanding of business concepts.	3.29	1.17	A
5	I use AI tools like Notion AI or Jasper to brainstorm innovative business ideas.	3.24	0.94	A
6	AI writing tools help me draft compelling business plans or proposals.	3.04	1.08	A

7	AI-powered visualization tools like Canva or Adobe Firefly help me create appealing marketing materials.	3.22	0.89	A
8	AI tools support me in identifying potential business opportunities and market trends.	2.89	1.05	A
9	I use AI tools (e.g., Microsoft Copilot, Tableau GPT) to analyze business finances.	2.56	1.24	A
10	AI-powered software assists me in making data-driven business decisions.	3.09	1.01	A
11	Tools like Otter.ai or Fireflies.ai help me transcribe and analyze meeting discussions for financial planning.	3.18	0.89	A
12	AI-powered tools like Canva or Synthesia help me create visually appealing advertisements.	3.57	0.50	SA
13	Chatbots and virtual assistants enable me to engage with customers effectively.	2.68	1.10	A
14	Social media management tools powered by AI (e.g., Hootsuite AI) help me market my products/services.	2.72	1.00	A
15	AI tools help me analyze customer feedback to improve my business offerings.	2.99	0.91	A
	Cluster Mean	**3.09**	**0.99**	A

The results presented in the Table 1 above provide a summary of mean ratings and standard deviations for the extent in which undergraduate Science Educationstudents utilize AI powered tools in enhancing their entrepreneurial skills amidst the economic downturn. The mean ratings for items 1-15 except item 12 pertaining to how students utilize AI powered tools in enhancing their entrepreneurial skills amidst the economic downturn fall within the range of 2.56 to 3.35. This indicates that students generally agreed on utilizing AI powered tools. The mean rating of item 12 is 3.57 indicating that students strongly agreed on utilizing AI powered tools. The cluster mean of 3.09 which falls within the range of 2.50-3.49 indicate a moderate level of utilization of AI powered tools by undergraduate science education students in Akwa Ibom State University despite the economic challenges. Hence, students concur that the utilization of AI powered tools can effectively enhance their entrepreneurial skills amidst the economic downturn.

Research Question Two

What is the gender differences in the perceive utilization of AI powered tools for entrepreneurial skill development among undergraduate students.

Table 2: Mean and standard deviation on the gender differences in the perceive utilization of AI powered tools for entrepreneurial skill development among undergraduate students

Gender	N	Mean	SD	Mean difference
Male	72	3.06	0.31	
				-0.05
Female	96	3.11	0.26	

The result in Table 2 above shows the gender differences in the perceive utilization of AI powered tools for entrepreneurial skill development among undergraduate students. The result showed that the mean and

standard deviation scores (3.06 and 0.31) of male respondents was lesser than mean and standard deviation scores (3.11 and 0.26) of female respondents over the perceive utilization of AI powered tools for entrepreneurial skill development. This was observed with a remarkable mean difference of -0.05 showing the difference in the perceive utilization of AI powered tools for entrepreneurial skill development.

Hypothesis One: There is no significant difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development.

Table 3: Independent t-test analysis on the mean rating of the difference between male and female students perceive utilization of AI powered tools for entrepreneurial skill development

Gender	N	Mean	SD	df	t-value	p-value
Male	72	3.06	0.31	166	-1.12*	0.272
Female	96	3.11	0.26			

*Not significant @ p>0.05 probability level

The result in Table 3 revealed that the independent t-test results on the difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development. Male students (M = 3.06, SD = 0.31) scored lesser than female students (M = 3.11, SD = 0.26). The t-value of -1.12 and degrees of freedom (df) of 166 yield a p-value of 0.272, which is greater than the typical significance level of 0.05, indicating that the difference between the two groups is not statistically significant. This implies that the hypothesis one is retained.Hence, there is no significant difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development.

Discussion of Findings

The findings on the analysis of the extent in which undergraduate Science Education students utilize AI powered tools in enhancing their entrepreneurial skills amidst the economic downturn shows that there was a moderate level of utilization of AI powered tools by undergraduate science education students in Akwa Ibom State University. The moderate level of utilization of AI powered tools by undergraduate science education students in Akwa Ibom State University for enhancing entrepreneurial skills could be attributed to digital literacy, economic constraints¸ awareness and social perceptions. Students might prioritize traditional career paths over entrepreneurship, affecting their motivation to utilize technology in ways that foster entrepreneurial skill development. These findings align with previous research by Adeyinka, Aderonmu and Taiwo (2017), and Nwachukwu (2018), who similarly identified infrastructure deficits, limited resources, and insufficient training as barriers to technology integration in education.

The analysis on the significant difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development revealed that there was no significant difference between male and female perceive utilization of AI powered tools for entrepreneurial skill development. This lack of significant difference in perceived utilization of AI powered tools for entrepreneurial skill development between male and female students could be attributed to the fact that both male and female students may have similar levels of access to AI powered tools, such as ChatGPT (for tutoring and idea generation), Grammarly (writing enhancement), Otter.ai (transcription), Quizlet AI Study Assistant, Edthena (AI for teacher feedback) among

others, which creates a level playing field in terms of usage opportunities. This result is in line with Alshammari, Alhassan & Alotaibi (2022) who found that both genders benefit equally from technology in fostering entrepreneurial capabilities. The result also agrees with the findings of Udofia, Babayemi and Sambo (2024) that there is no significant difference between male and female science lecturers on the use of zoom machines during science lesson deliveries. This result disagrees with Udofia and Sambo (2022) whose findings revealed that there is a significant gender difference between male and female teacher educators use of digitalized teaching strategy in their STEM pre service teacher preparation in favor of the female pre-service teachers.

Conclusion

The study found that undergraduate Science Education students of Akwa Ibom State University moderately utilize AI powered tools to enhance their entrepreneurial skills, indicating partial adoption of digital tools to support entrepreneurship amidst economic challenges. Additionally, the results revealed no significant difference between male and female students in their perception of utilizing AI powered tools for entrepreneurial skill development. This lack of gender disparity suggests that both male and female students are equally inclined to use AI powered tools, indicating a balanced perception of its benefits. However, the moderate utilization level points to potential barriers that may be limiting full engagement, highlighting an opportunity to improve access, awareness, and support for using AI powered tools for entrepreneurship.

Recommendations

1. Educational institutions should incorporate AI literacy into their curriculum to ensure that students are proficient in using AI tools. This will not only enhance their academic performance but also equip them with the digital skills necessary for entrepreneurial ventures in the modern economy.
2. The school should implement workshops, courses, and mentorship programs focused on digital literacy and entrepreneurship, specifically designed to show students how to leverage AI powered tools for developing business ideas and skills.
3. To encourage balanced participation and support from both genders, the university should foster a technology-driven entrepreneurial culture that celebrates innovation and inclusivity. This could involve organizing events, competitions, and hackathons that allow students to develop entrepreneurial ideas using A1 tools, thus normalizing the use of digital tools in entrepreneurship and creating an inclusive environment for all students to explore these opportunities equally.

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