

APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) AND BUSINESS EDUCATION UNDERGRADUATES' ACQUISITION OF COGNITIVE INNOVATIVE SKILLS FOR SELF-SUSTENANCE IN ANAMBRA STATE

By

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Abstract

This study investigated the application of AI and business education undergraduates' acquisition of cognitive innovation skills for self-sustenance in Anambra State. Two research questions and two null hypotheses guided the study. The study adopted a descriptive survey research design. The population of the study comprised 112 business educators in public tertiary institutions offering business education programme in the State. Structured questionnaire containing 18 items, and faced validated by three experts in Business Education and Measurement and Evaluation was used for data collection. The reliability of the instrument calculated using Cronbach alpha formula yielded correlation coefficients of .85 and .77 for clusters B1 to B2 respectively with an overall index of .81. Mean, standard deviation and t-test were used for data collection. Findings revealed that business educators lowly apply AI in instructional delivery to enhance undergraduates' acquisition of information literacy and analytical thinking skills for self-sustenance in Anambra State. It was also revealed that years of experience was not a significant factor on respondents' mean ratings on level of application of AI in enhancing undergraduates' of the two skills covered. The researcher concluded that the potential of AI to enhance undergraduates' acquisition of information literacy and analytical thinking skills for self-sustenance is yet to be fully realized. It was recommended that tertiary institutions in Anambra State should organize continuous professional development programmes and hands-on workshops to build business educators' competence and confidence in integrating AI tools into instructional delivery. These programmes should focus on practical applications of AI for developing students' information literacy and analytical thinking skills required for self-sustenance in the digital economy.

Keywords: Application, Artificial Intelligence (AI), Business Education, Cognitive Innovative Skills, Self-sustenance

Introduction

Due to globalization and technological improvements, business education undergraduates face both tremendous obstacles and previously unheard-of opportunities in the ever-changing world of higher education. In this sense, business education is crucial for training youths to navigate the complexities of today's and future workforce (Mihai & Băbuț, 2021). In Nigeria, business education programme aims to equip students with skills relevant for future employment, thereby addressing youth/graduate unemployment. Defined by Okoye and Ashibogwu (2018) as a segment of vocational education, business education prepares individuals with the necessary skills for various careers. It is designed to produce job creators and foster wealth, employment, and poverty alleviation. Offered at universities and colleges, the curriculum includes courses in Accounting, Office Technology, Commerce Cooperative/Distributive Education, Business Communication, Human Resource Management and Entrepreneurship. The Federal Republic of Nigeria (FRN, 2013) in her National Policy on Education (NPE) outlines the goals of business education, stressing the importance of providing knowledge and skills for economic growth and technological understanding. Similar to this, Okon and Okon (2023) stated that business education programmes teach both hard and soft skills. Accounting skills, sound financial management, marketing analytics, entrepreneurship, and information technology skills are examples of hard skills. Conversely, soft skills cover leadership skills, critical thinking, creativity, adaptability, teamwork time management skills and most importantly cognitive innovative skills.

Cognitive innovative skills involve higher order intellectual abilities and creative thinking, allowing individuals to solve problems uniquely. These skills enable the generation and implementation of new concepts, adaptation to change and inventive responses to novel situations (Beefink et al., 2019). They integrate cognitive, behavioural, and functional skills, promoting innovation across various fields. Chapman et al. (2017) stated that cognitive innovation specifically requires flexible and adaptive thinking, crucial in a rapidly changing environment. Developing cognitive innovative skills, as outlined by Vincent-Lancrin et al. (2019), includes idea generation, analytical thinking and information literacy. These skills are crucial for undergraduates facing the complexities of the 21st century entrepreneurial environment. Furthermore, Awad, Jasim, and Salim (2023) emphasized that these cognitive innovative skills prepare undergraduates for evolving business conditions by enhancing their analytical thinking skills.

Analytical thinking skills refer to the abilities to gather, interpret and evaluate information, then reason logically, identify patterns or relationships, and make reasoned decisions or conclusions

(University of Manchester, 2025). Students upon graduation must possess analytical thinking skills since they are the cornerstone of sound decision-making and problem-solving in today's business environment (Dalton, 2025). Analytical thinking skills play critical role in managing the complexity of modern businesses (Oluwalola, 2021). Key analytical thinking skills for business education undergraduates include: gathering and organizing relevant information; interpreting data to identify trends and relationships; problem-solving, decision-making by analyzing options; and effectively communicating insights to support decision-making. Information literacy on the other hand refers to the ability to recognize when information is needed and to locate, evaluate, use and communicate that information effectively and ethically. the American Library Association (ALA) (2025) defined information literacy as a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Thus, information literacy goes beyond simply finding information, it involves critical evaluation, ethical use and the capacity to use information meaningfully.

For business education undergraduates, acquiring cognitive innovative skills is crucial because they underpin academic success, workplace readiness, and entrepreneurial self-sustenance. Without these skills, business education undergraduates risk being ill-prepared for the demands of the business environment where information is abundant but meaningful insight and application depend on one's analytical thinking skills. Business education undergraduates in Nigerian tertiary institutions will need a constantly changing set of skills as jobs are reshaped by demographic changes and technology breakthroughs especially artificial intelligence (AI). The swift diffusion of AI is reshaping how knowledge is created, delivered and applied in higher education (Oguguo et al., 2024). Artificial intelligence (AI) is a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence (Agogbua et al., 2024). It is the simulation of human intelligence in machines programmed to think, learn, and perform tasks typically requiring human intelligence. AI is the use of scientific techniques and methodologies to build intelligent robots and machines using clever computer programmes that can mimic humans and make daily activities easier (Godpower & Egbunefu, 2024). It encompasses the development of intelligent systems and machine learning that facilitate decision-making, automate processes, personalize learning experiences and enhance analytical thinking skills in business education.

However, Adeyemi, Alanamu, and Obisesan (2025) pointed out that, and as observed by Adeyemi et al. (2025) in Nigeria, difficulties such insufficient faculty training, unclear institutional regulations, and infrastructure challenges must be addressed for effective integration into pedagogy. In order to better train graduates for job creation and adaptation in shifting labour markets, Dambo and Nwauzor (2023) contended that entrepreneurial skills such as analytical and information management should be emphasized in the business education curriculum. To achieve

this, the application of AI by business educators is paramount so as to link theoretical knowledge with practical application, and enhance graduates' self-reliance.

The term application generally refers to the practical use or implementation of knowledge, theory, tools, or technology to achieve a desired purpose or solve a specific problem. According to Hornby (2020), application is the act of putting something into operation or use.” In the academic and technological context, it describes the process of utilizing acquired knowledge or technology to perform tasks, improve productivity, or enhance outcomes (Okoye & Eze, 2023). Therefore, application goes beyond mere awareness or possession of tools, it involves intentional and effective deployment of those tools in real-world situations to achieve measurable results.

The persistent gap between the skills taught in business education programme and skills demanded by employers can be due to inadequate adoption of innovative pedagogies and practical experiences by business educators. Nigerian studies on entrepreneurial skill development and employability call for instructional strategies that move beyond rote learning to experiential, problem-based and technology-enhanced methods that nurture these cognitive innovative skills among undergraduates of business education programme. Despite these imperatives, Buttice (2019) noted that one of the major challenges facing application of AI in higher education in Nigeria is the wildly uneven IT infrastructure. Buttice disclosed that AI demands incredibly powerful networks, steady connectivity, and vast amounts of processing power which are lacking in most higher institutions. Similarly, Oguguo et al. (2024) found that lack of regulatory framework for integrating AI in Nigerian education, infrastructural and skilled labour shortages hinder effective application of AI in instructional processes. Furthermore, given that effective application of AI in teaching presupposes both business educator readiness and institutional support, the situation points to a substantive implementation gap AI's potential to foster cognitive innovative skills among business-education undergraduates remains largely unrealized in many Nigerian settings.

The application of AI tools in enhancing cognitive innovative skills among business education undergraduates is influenced by the teaching experience of business educators. Those with less than 5 years of experience, often termed digital natives; typically have greater familiarity with AI tools and a more positive perception of their benefits in instructional delivery, potentially leading to increased application of AI for developing skills like information literacy and analytical thinking. Conversely, business educators with over 5 years of experience possess significant traditional pedagogical knowledge but may encounter resistance to adopting new technologies, thus facing challenges in applying unfamiliar AI tools into their instructional practices. This study therefore investigated the application of Artificial Intelligence (AI) and business education undergraduates' acquisition of cognitive innovative skills for self-sustenance in Anambra State.

Statement of the Problem

The twenty-first century workplace increasingly revolves around artificial intelligence (AI), automation, and digital innovation, highlighting the necessity for tertiary institutions to emphasize cognitive innovative skills for success in a knowledge-based economy. Business education plays a crucial role in preparing graduates for self-reliance and gainful employment; however, there are still concerns that most business education undergraduates in Nigeria, particularly in Anambra State, appear to possess low essential skills to compete in an AI-driven business environment. Despite AI's recognition as a transformative educational tool, its actual application within Nigerian tertiary institutions seems to be minimal. Business educators appear to show inadequate exposure to AI tools such as intelligent tutoring systems and adaptive learning platforms, often relying on traditional, teacher-centered teaching methods that emphasize memorization over innovation. This old pedagogical environment contrasts sharply with the demands of the Fourth Industrial Revolution, perpetuating high youth/graduates unemployment rates in Nigeria especially Anambra State. Business education undergraduates are expected to possess entrepreneurial skills, yet often fall short in cognitive innovation, attributed to inadequate application of digital tools and AI instructional strategies. Despite national policies promoting digital technology application for quality business education, significant gap appears to persist between these policies and classroom application. Business educators face challenges like poor ICT infrastructure and low AI literacy, resulting in under application of AI tools that could enhance creativity and collaboration. This limited application hinders undergraduates' opportunities for interactive and problem-based learning experiences, thus reducing their ability to innovate and adapt to digital workplaces upon graduation. This study therefore determined the application of AI and business education undergraduates' acquisition of cognitive innovative skills for self-sustenance in Anambra State.

Purpose of the Study

The main purpose of this study was to examine the application of AI and business education undergraduates' acquisition of cognitive innovative skills for self-sustenance in Anambra State. Specifically, this study determined the extent business educators;

1. Apply AI tools for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State.
2. Apply AI enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State.

Research Questions

The following research questions were posed to guide the study;

1. To what extent do business educators apply AI to enhance undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State?
2. To what extent do business educators apply AI enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State?

Null Hypotheses

1. Business educators do not differ significantly in their mean ratings on the extent they apply AI for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State based on years of teaching experience.
2. There is no significance difference in the mean ratings of business educators on the extent AI is applied for enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State based on years of teaching experience.

METHODS

The study adopted descriptive survey research design. The study was carried out in Anambra State in South-East, Nigeria. The population of the study consisted of 112 business educators in four public tertiary institutions offering business education in Anambra State. Instrument for data collection was a structured questionnaire titled "Application of AI and Business Education Undergraduates' Acquisition of Cognitive Innovative Skills for Self-sustenance (AAIBEUACISS)". The instrument was in two parts 1 and 2. Part 1 elicit demographic information of the respondents such as years of teaching experience while part 2 was divided into sections A and B containing 19 items. Section A contained 9 items on application of AI for enhancing undergraduates' acquisition of information literacy skills and section B with 10 items on application of AI for enhancing undergraduates' acquisition of analytical thinking skills. The instrument was structured on a five points rating scale of Very Highly Applied (VHA) – 5, Highly Applied (HA) – 4, Moderately Applied (MA) – 3, Lowly Applied (LA) -2 and Very Lowly Applied (VLA) – 1.

Face and content validity of the instrument was ascertained using three experts, two from Business Education in the Department of Vocational Education and one expert from Measurement and Evaluation all in Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus. The reliability of the instrument was established using pilot testing method, and data collected were calculated using Cronbach alpha formula which yielded correlation coefficients of .85 and .77 for sections A and B respectively, with an overall .81 obtained. The researcher administered copies of the questionnaire to the respondents with the help of three research assistants adequately briefed on the procedure. Out of 112 copies of the questionnaire distributed, 106(95%) were correctly ticked

and returned which was used for data analysis. Statistical mean and standard deviation were used to answer the research questions and determine the homogeneity of the respondents' mean ratings. Independent t-test was used to test the null hypotheses at 0.05 level of significance. A null hypothesis was accepted where the p-value is equal or greater than the alpha level of 0.05, and rejected where the p-value is equal to or less than 0.05. The analysis was carried out using Statistical Package for Social Sciences (SPSS) 25.0.

Results

Table 1: Respondents Mean Ratings and Standard Deviation on the Extent of Application of AI Tools for Enhancing Undergraduates' Acquisition of Information Literacy Skills for Self-reliance

S/N	Application of AI and Information Literacy Skills	$\bar{X}$	SD	Remarks
	I apply;			
1	ChatGPT to help students identify credible online academic sources	3.52	.87	Very Highly Applied
2	AI search engines to improve students' online research skills	3.42	.63	Moderately Applied
3	AI to teach students how to evaluate the originality of digital information	2.35	.66	Lowly Applied
4	AI plagiarism detection tools to develop students' respect for intellectual property	2.05	.69	Lowly Applied
5	AI learning platforms to teach students effective online search strategies	2.40	.67	Lowly Applied
6	AI assisted digital libraries in my classroom practices	1.52	.58	Lowly Applied

7	AI content analysis tools to enhance students' ability to interpret digital data	1.60	.70	Lowly Applied
8	AI fact checking tools to teach students how to verify information sources	1.52	.82	Lowly Applied
9	AI simulations to demonstrate to students ethical and responsible use of online information	1.49	.66	Very Lowly Applied
Average Mean		2.20		Lowly Applied

Data in table 1 shows that out of nine items listed on application of AI tools for enhancing undergraduates' acquisition of information literacy skills, the respondents very highly applied item 1 with mean score of 3.52. Item 2 is moderately applied with mean score of 3.42, six items are lowly applied with mean scores ranging from 1.52 to 2.40 while the remaining one item is very lowly applied with mean score of 1.49. The average mean score of 2.20 shows that on the whole, business educators lowly applied AI tools for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State. Standard deviations for all the items are within the same range showing that the respondents are not wide apart in their ratings perceptions.

Table 2: Table 1: Respondents Mean Ratings and Standard Deviation on the Extent of Application of AI Tools for Enhancing Undergraduates' Acquisition of Analytical Thinking Skills for Self-reliance

S/N	Application of AI and Information Literacy Skills	$\bar{X}$	SD	Remarks
	I apply;			
10	AI tools to present problem-solving scenarios that promote analytical reasoning among students	2.4 1	.67	Lowly Applied
11	AI based case study analysis to help students evaluate business situations critically	1.8 2	.83	Lowly Applied

12	AI tools to engage students with simulations for decision-making exercises.	1.3 5	.56	Lowly Applied
13	AI based case study analysis to help students evaluate their business situations critically	1.6 5	.79	Lowly Applied
14	AI tools to encourage students to compare and contrast business data or trends	2.6 0	.60	Moderately Applied
15	Data visualization tools to enhance students' interpretation of complex information.	1.7 6	.68	Lowly Applied
16	AI learning analytics to help students reflect on and improve their reasoning skills.	3.1 0	.85	Moderately Applied
17	AI analytical tools to design assignments requiring students to generate insights	1.5 8	.73	Lowly Applied
18	AI to simulate real world business problems requiring critical and analytical solutions.	1.5 0	.55	Lowly Applied
19	AI assisted tools to support students in evaluating alternative solutions to business issues	2.0 9	.81	Lowly Applied
Average Mean		2.2 1		Lowly Applied

Data in table 2 shows that out of 10 items listed on application of AI tools for enhancing undergraduates' acquisition of analytical thinking skills, the respondents moderately applied items 14 and 16 with mean scores of 2.60 and 3.10. The remaining eight items are lowly applied with mean scores ranging from 1.50 to 2.41. The average mean score of 2.21 shows that on the whole, business educators lowly applied AI tools for enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State. Standard deviations for all the items are within the same range showing that the respondents are not wide apart in their ratings perceptions.

Table 3:T-test Analysis of Significant Difference in the Mean Ratings of Business Educators on the Extent they Apply AI for Enhancing Undergraduates' Acquisition of Information Literacy Skills for Self-reliance Based on Years of Experience

Years of Experience	N	$\bar{X}$	SD	df	t-value	P-value	Decision
Below 5 years	39	2.23	.71				
6 and above years	67	2.17	.68				
1042.15.03Significant							

Table 3 show that t-value of 2.15 at 104 degree of freedom with a p-value of .03 which is less than the alpha value of .05 ($.03 < 0.05$). Since the p-value is less than the significant value, the null hypothesis is therefore rejected. This means that business educators differ significantly in their mean ratings on the extent they apply AI for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State based on years of teaching experience.

Table 4: T-test Analysis of Significant Difference in the Mean Ratings of Business Educators on Adequacy of Data Protection Measures for Business educators' Adoption of AI Technologies for Instructional Delivery Based on Years of Experience

Years of Experience	N	$\bar{X}$	SD	df	t-value	P-value	Decision
Below 5 years	39	1.52	.68	104	.25	.78	Not Significant
6 and above years	67	1.48	.74				

Table 4 show that t-value of .25 at 104 degree of freedom with a p-value of .78 which is greater than the alpha value of 0.05 (.78 > 0.05). Since the p-value is greater than the significant value, the null hypothesis is therefore accepted. This means that there is no significance difference in the mean ratings of business educators on the extent AI is applied for enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State based on years of teaching experience.

Discussion of Findings

Findings of the study revealed that business educators lowly applied AI tools for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary institutions in Anambra State. Findings could be attributed to several factors such inadequacies in technological infrastructure such as poor internet and unreliable electricity; inadequacy or lack of AI literacy and training among business educators which hampers effective application of these tools in teaching information literacy; financial constraints preventing the acquisition of advanced AI software; and curriculum lag where business education programme fails to incorporate emerging technologies like AI. In agreement, Ogbari, Oludipe, and Osibanjo (2025) reported a low extent of utilization of AI tools by business educators. Similarly, Akeke, Atah, and Chukwurah (2025) noted that infrastructural deficits, financial constraints, limited lecturer training, and institutional barriers hinder high application of AI tools in instructional delivery by lecturers. Ukeh and Anih (2024) found that the level of application of AI technologies in instructional delivery by lecturers in Nigeria was low. Akinyemi and Ezekiel (2022) earlier reported low application of AI by lecturers in enhancing students' acquisition of employability skills. Findings of the study also revealed that business educators differ significantly in their mean ratings on the extent they apply AI for enhancing undergraduates' acquisition of information literacy skills for self-reliance in tertiary

institutions in Anambra State based on years of teaching experience. In agreement, Olayinka and Okoro (2025) attributed difference in level of application of AI between experienced and inexperienced lecturers to the inadequacy of current professional development programmes to meet the specific reskilling needs of experienced lecturers.

Findings of the study revealed that business educators lowly applied AI tools for enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State. This finding is indicative of a significant pedagogical and systemic gap in applying advanced technologies for employability skill development. The study revealed a surprising gap despite the potential of AI tools like data visualization software and predictive platforms in enhancing undergraduates' analytical thinking skills, their low application by business educators indicates significant barriers. These include a lack of redesigned pedagogy for the AI era, a possible lack of proficiency among business educators in applying these tools, and fears of students over-relying on generative AI for problem-solving, leading to a conservative approach to AI integration in teaching critical analytical skills. According to Nuhu (2025) the utilization of AI tools by lecturers in tertiary institutions for educational purposes was low. Nuhublamed a significant gap in the professional development and specialized training necessary for lecturers to apply AI tools effectively in their teaching. Findings of the study also revealed that there was no significance difference in the mean ratings of business educators on the extent AI is applied for enhancing undergraduates' acquisition of analytical thinking skills for self-reliance in tertiary institutions in Anambra State based on years of teaching experience. Supporting this finding, Adeyemi and Olamide (2020) revealed that adoption of digital tools was not based on years of working experience.

Conclusion

Based on the findings of this study, the researcher concludes that the potential of AI to enhance undergraduates' acquisition of information literacy and analytical thinking skills for self-sustenance is yet to be fully realized in business education programme in tertiary institutions, Anambra state.

Recommendations

Based on the findings of the study, the researcher makes the following recommendations;

1. Administrators of tertiary institutions in Anambra State should organize continuous professional development programmes and hands-on workshops to build business educators' skills and confidence in applying AI tools into instructional delivery. These programmes should focus on practical applications of AI for developing undergraduates''

information literacy and analytical thinking skills required for self-sustenance in the digital economy.

2. The Nigerian government should partner with private sectors to provide AI teaching technologies, software and digital resources in business education departments across tertiary institutions in the country. This will facilitate seamless and improved application of AI tools by business educators for enhancing undergraduates' acquisition of cognitive innovative skills for self-sustenance.

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