East Asian Journal of Multidisciplinary Research (EAJMR)
Vol. 5, No. 7, 2026: 2703 - 2712

The Use of Artificial Intelligence Tools in Enhancing Experiential and Project-Based Learning in Entrepreneurship Course in the Nigerian University System

Odewumi Adenike Seyi[1*], Dekom Habila Bako[2], Gontur Silas[3], Awoena Felix Dashe[4], Gidado Sulayman Dauda[5]
Federal University of Education, Pankshin, Plateau State, Nigeria
Corresponding Author: Odewumi Adenike Seyi adenikeodewumi@fuep.edu.ng

ARTICLEINFO

Keywords: Artificial Intelligence, Experiential Learning, Project-Based Learning, Entrepreneurship

Received : 12, May
Revised : 13, June
Accepted: 18, July

ABSTRACT

The Nigerian university system is beginning to acknowledge the significance of experiential and project-based learning (PBL) approaches in entrepreneurship education. While these are promising scenarios, the implementation of AI in entrepreneurship courses in Nigeria is still at its promising stage. Using a cross-sectional mixed-method design to explore the role of AI tools in experiential and project-based learning in entrepreneurship education on a sample of 300 students, 60 lecturers and 9 administrators chosen using stratified random sampling, the study set to determine the effect of AI tools in the improvement of quality and performance of entrepreneurship education in Nigerian universities. Quantitative data were collected using standardized, self-administered questionnaires through Google Form. Validity of the instrument was determined by expert review (n = 3). Qualitative data were derived through semi-structured interviews that were transformed into a structured questionnaire for administrators. Data were analyzed using descriptive statistics, independent-samples t-tests, ANOVA, and multiple regression to explore the relationships and predictors among the key variables.

DOI prefix: https://doi.org/10.55927/eajmr.v5i7.233
ISSN-E: 2828 – 1519 (Online)
https://journaleajmr.my.id/index.php/eajmr

INTRODUCTION

AI technologies are revolutionizing learning environments worldwide and creating new opportunities for the enhancement of instruction and knowledge processes. The Nigerian university system is beginning to acknowledge the significance of experiential and project-based learning (PBL) approaches in entrepreneurship education to equip the students with real world skills and business mindsets that are vital to success in complex work environments (Kolb, 1984). These teaching methods promote active participation, experiential and repetitive learning which are fundamental in developing modernization and resilience in would be entrepreneurs.

AI tools, such as intelligent tutoring systems, virtual business recreations and data driven learning analytics have the potential to significantly advance the field of experiential and project based learning by providing personalised, adaptive and collaborative learning practices (Luckin, & Guba, 2016). Entrepreneurship education in Nigerian universities is strategically designed to alleviate the problem of high rate of youth unemployment and to promote economic development. AI application can mitigate traditional instructional scenarios like large classes, limited access to real-world business environments, and resource limitations (Ayeni, et al, 2024). Simulations, enhanced by artificial intelligence, provide a safe and controlled environment for students to play with business decisions and to learn problem-solving and critical-thinking skills without the financial risks that would be involved in real economic investments (Zawacki Richter et al., 2019).

While these are promising scenarios, the implementation of AI in entrepreneurship courses in Nigeria is still at its promising stage with experiences such as lack of infrastructure, low levels of digital learning and institutional readiness confronting its deployment. These barriers need to be addressed to fully exploit the potential of AI to revolutionize entrepreneurship education through experiential or project-based learning. The study is set to determine the effect of AI tools in the improvement of quality and performance of entrepreneurship education in Nigerian universities through experiential or project-based learning. It provides insight into best practices, challenges and policy implications that are critical for effective implementation.

THEORETICAL REVIEW

There is an increasing use of AI to transform educational paradigms, enabling personalized, adaptive and immersive learning experiences globally (Luckin & Guba, 2016; Zawacki Richter et al., 2019). These skills are particularly pertinent to experiential and project based learning (PBL) that emphasise active participation, reflection and application for the real-world (Kolb, 1984; Bell, 2010).

Artificial Intelligence in higher education, particularly in Nigeria is still poorly integrated and only at infancy. Institutional capacity deficiencies (including poor infrastructure, governance and human resources) are major obstacles to ethical and systematic AI adoption (Obadiaru & Anih, 2026). Similarly, lack of infrastructure, and lack of competent personnel hinder the

implementation on the aspects of education especially in teaching; research and administration across Nigerian universities (Orie, 2026).

However, empirical evidences indicate that AI-based technologies improve entrepreneurial competency in the graduates. In business education graduates in Edo State, AI tools encourage opportunity recognition, critical thinking, innovation and digital scalability (Agbonaye & Muhammed, 2025). Adelakun, et al., (2025) findings show that AI paradigms assist in promoting creativity, employability and commercial willingness.

Tijani & Adeduyigbe (2026) argue that, besides enhancing the teaching of entrepreneurship, students' perceive AI-powered adaptive learning as an instructional technology that could potentially enhance equitable teaching practices in Nigerian universities, which are only influenced by the level of institutional readiness for organizational change and the presence of adequate infrastructure and instruction alignment needed for effective integration of AI into their curricula. Besides, we trained our learners using Artificial Intelligence tools such as intelligent tutors and analytics dashboards that promote self-regulated learning to motivate learner autonomy through metacognitive planning monitoring, but this also presents an institutional ethical challenge (Omoyajowo & Bambi, 2025).

Finally, the digital literacy of Nigerian undergraduates is elementray and inelaborate. Also, the findings reveal that although students were digitally skilful, they are unable to evaluate and access scholarly materials. It is suggested that the institutions should support these critical digital skills. (Oladokun et al., 2026).

METHODOLOGY

Design: The current study used a cross-sectional mixed-method design to explore the role of AI tools in experiential and project-based learning in entrepreneurship education. The combination of quantitative and qualitative data allowed for richer and more comprehensive insights to be generated

Participants and Sampling: The study was conducted on students, lecturers and administrators in entrepreneurship courses in some selected universities in Nigeria. In line with recommendations for robust survey research, a sample of 401 students, 70 lecturers and 9 administrators were chosen using stratified random sampling for adequate representation.

Data Collection Quantitative Standardized, self-administered questionnaires through Google Form. Validity of the instrument was determined by expert review (n = 3) and pilot testing. The internal consistency was acceptable (Cronbach's alpha coefficients > 0.70).

Qualitative Data: Semi-structured interviews were transformed into a structured questionnaire for administrators, covering experiences and challenges in AI implementation related to security concerns.

Ethical considerations: The study was approved by the institutional review boards of the universities involved, in accordance with the BERA (2018) guidelines. All participants provided informed consent. Participation was

voluntary, and confidentiality and anonymity were strictly observed. The data were kept secure and accessible only to the research team.

Method of Data Analysis: Data were analysed using descriptive and inferential statistics. Descriptive statistics (mean and standard deviation) were used to determine the level of adoption of artificial intelligence tools in experiential and project-based learning. Decision-making for descriptive items was based on a 4-point Likert-scale benchmark, where a mean score of 2.50 or above indicated agreement or a moderate-to-high presence of the construct. Inferential statistics included simple linear regression to test the effect of AI adoption on student engagement, creativity, and project outcomes. Multiple regression analysis was used to determine the predictive influence of lecturer readiness and institutional support on AI integration. One-way ANOVA was used to test the significance of regression models, while t-tests were used to determine the significance of individual predictors. All hypotheses were tested at the 0.05 level of significance.

RESULTS

The results of the study are presented below, organized by research question and tested hypotheses.

Table 1. Descriptive Statistics of Student Responses on AI Adoption, Engagement, Creativity, and Institutional Support (N = 401)

Variable	Mean	SD	Remarks
AI tool usage in learning	2.91	1.07	Moderate
Lecturer's encouragement of AI use	2.51	0.94	Moderate
Student readiness for AI learning	2.77	0.87	Moderate
Institutional access to AI tools	2.86	0.98	Moderate
Institutional promotion of AI tools	2.44	0.90	Low

The findings presented in Table 1shows that the adoption of AI tools in entrepreneurship education is moderate across Nigerian universities. Among students, the mean use of AI tools for learning was 2.91 (SD = 1.07), indicating a moderate level of exposure and engagement with AI-based learning tools. Similarly, lecturer encouragement of AI use (M = 2.51, SD = 0.94) and institutional promotion of AI tools (M = 2.44, SD = 0.90) further suggest that AI adoption is present but not strongly institutionalized.

Table 2. Descriptive Statistics of Lecturer Responses on AI Integration in Teaching and Institutional Support (N = 79)

Variable	Mean	SD	Remarks
AI integration in teaching practice and industrial training	2.27	1.06	Low integration

Use of AI tools in instruction	2.23	0.98	Low usage
Comfort with AI in PBL	2.25	1.07	Low
Perceived student engagement via AI	2.40	0.99	Moderate perception
Student performance improvement	2.53	0.95	Moderate
Institutional support for AI adoption	2.67	1.07	Moderate

From the lecturers' perspective (Table 2), AI integration in teaching practice and industrial training recorded a mean of 2.27 (SD = 1.06), while use of AI tools in instruction was 2.23 (SD = 0.98). These values indicate that adoption at the instructional level remains relatively low to moderate. The rate of AI adoption is moderate but not fully institutionalized, indicating early-stage integration in Nigerian university entrepreneurship education.

Table 3. Multiple Linear Regression Model Summary for the Effect of AI Adoption on Student Outcomes

R	R^2	Adj. R^2	Std. Error
0.48	0.23	0.21	0.74

The regression analysis in Table 3 reveals that AI adoption has a moderate positive relationship with student learning outcomes (R = 0.48). The coefficient of determination (R^2 = 0.23) indicates that AI adoption explains 23% of the variation in student engagement, creativity, and project performance. The ANOVA results in Table 4 confirm that the model is statistically significant (F = 19.88, $p < .001$), indicating that the observed relationship is not due to chance. Furthermore, Table 5 shows that AI adoption is a significant positive predictor of student outcomes ($\beta = 0.48$, $t = 4.46$, $p < .001$), meaning that increased AI usage leads to improved engagement, creativity, and project performance.

Table 4. Regression Model Predicting Student Outcomes from AI Adoption

Source	SS	Df	MS	F / p
Regression	34.62	1	34.62	F = 19.88, p < .001
Residual	115.91	399	0.29	
Total	150.53	400		

The regression Model results presented in Table 4 indicate that the regression model is statistically significant, with $F(1, 399) = 19.88$, $p < .001$, at the 0.05 significance level. Since the p-value is less than 0.05, the null hypothesis of no model effect is rejected. This implies that the regression model provides a statistically significant fit to the data, and the predictor variable significantly accounts for variation in the dependent variable.

Table 5. Regression Coefficients for AI Adoption Predicting Student Outcomes

Predictor	B	SE	Beta	t / p
Constant	1.82	0.21	-	t = 8.67, p < .001
AI Adoption Scale	0.41	0.09	0.48	t = 4.46, p < .001

The regression coefficients presented in Table 5 were obtained using simple linear regression analysis (SPSS) to test Hypothesis 1 (H01), which states that there is no significant relationship between the use of AI tools and student engagement, creativity, and project outcomes in entrepreneurship course in Nigerian universities. The result shows that AI Adoption Scale is a statistically significant predictor of student outcomes (B = 0.41, SE = 0.09, β = 0.48, t = 4.46, p < .001). Since the p-value is less than 0.05, the null hypothesis (H01) is rejected at the 5% significance level. This indicates that the predictor variable significantly explains variation in the dependent variable within the regression model.

Table 6. Multiple Regression Model Summary for Lecturer Readiness and Institutional Support on AI Integration

R	R^2	Adj. R^2	Std. Error
0.52	0.27	0.25	0.68

The multiple regression model summary presented in Table 6 was generated using multiple linear regression analysis (SPSS) to test the hypothesis that examines the joint effect of lecturer readiness and institutional support on AI integration in teaching. The results show a multiple correlation coefficient (R) of 0.52, indicating a moderate relationship between the predictor variables and AI integration. The coefficient of determination ($R^2 = 0.27$) indicates that lecturer readiness and institutional support jointly explain 27% of the variance in AI integration. The adjusted R^2 value of 0.25 indicates that the model remains stable after accounting for the number of predictors. The standard error of estimate (0.68) reflects the average deviation of observed values from the model's predictions. Since the model summary provides evidence of a statistically meaningful explanatory relationship, the null hypothesis is not supported at the model level.

Table 7. Regression Coefficients for Predictors of AI Integration in Teaching

Predictor	B	SE	Beta	t / p
Constant	1.31	0.19	-	t = 6.89, p < .001
Institutional Support	0.28	0.08	0.32	t = 3.50, p < .001
Lecturer Readiness	0.35	0.07	0.41	t = 5.00, p < .001

The regression coefficients presented in Table 7 were estimated using multiple linear regression (SPSS) to test the hypothesis that institutional support

and lecturer readiness significantly predict AI integration in teaching. The results show that institutional support is a statistically significant predictor of AI integration ($B = 0.28$, $SE = 0.08$, $\beta = 0.32$, $t = 3.50$, $p < .001$). Similarly, lecturer readiness also demonstrates a statistically significant effect on AI integration ($B = 0.35$, $SE = 0.07$, $\beta = 0.41$, $t = 5.00$, $p < .001$). Since the p-values for both predictors are less than 0.05, the null hypothesis is rejected at the 5% significance level for both variables. This indicates that both institutional support and lecturer readiness significantly predict the level of AI integration in teaching.

DISCUSSION

The first research question examined the extent to which artificial intelligence tools have been adopted in experiential and project-based learning within entrepreneurship course in Nigerian universities. Findings reveal a consistent pattern of moderate adoption across students, lecturers, and administrators, indicating that AI integration remains in the early stages of diffusion rather than full institutionalisation. The system is characterised more by exploratory usage than by embedded instructional transformation, a pattern that reflects structural constraints within the higher education environment rather than individual reluctance alone. These findings aligned with Zawacki-Richter et al. (2019), who observed that AI integration in higher education globally remains emergent, particularly in developing educational systems where implementation tends to be uneven. It also aligns with Orie (2026), who reported that Nigerian universities face systemic constraints, including inadequate infrastructure and fragmented governance structures that slow the diffusion of AI. Eleje et al. (2025) similarly found moderate acceptance of AI tools among lecturers in Nigerian universities, reinforcing evidence of partial, but not yet institutionalised, adoption. However, the finding contrasts with Luckin and Guba (2016), who anticipated faster institutional uptake of AI-driven learning systems in policy-supported higher education contexts, suggesting that contextual limitations in Nigeria significantly moderate global expectations of AI diffusion. The hypothesis associated with this research question, which stated that there is no significant relationship between the use of AI tools and student engagement, creativity, and project outcomes, was rejected on the basis of the statistical evidence, confirming a significant relationship. This implies that even at moderate levels of adoption, AI tools already apply measurable influence on experiential learning outcomes, reinforcing the argument that early-stage integration continues to yield meaningful pedagogical value.

Furthermore, the second research question examined the effect of AI tools on student engagement, creativity, and project outcomes. Results show a statistically significant positive relationship, leading to the rejection of the null hypothesis. This indicates that increased exposure to AI-supported learning environments enhances student engagement and strengthens the outcomes of creative and entrepreneurial projects in entrepreneurship course. This finding is strongly supported by Obomeghie (2025), who reported that students exposed to AI-based instructional tools demonstrated higher levels of entrepreneurial achievement and improved academic performance. It also aligns with Agbonaye

and Muhammed (2025), who found that AI-supported learning environments enhance opportunity recognition, innovation, and digital entrepreneurial competencies among graduates. Lee and Kim (2019) similarly confirmed that AI-integrated project-based learning significantly improves collaboration and creative output in higher education. The finding does, however, contrast with Eleje et al. (2025), who reported that while AI tools improve learning outcomes, lecturers expressed concern about unintended behavioural dependence on technology, suggesting that gains in engagement may come with pedagogical trade-offs not fully captured by performance metrics alone. The second null hypothesis, which stated that AI tools do not significantly influence student engagement, creativity, and project outcomes, was rejected by the empirical evidence. This confirms a significant positive influence and indicates that AI integration is not merely supplementary but functionally transformative in shaping entrepreneurial learning outcomes.

In addition, the third research question examined the influence of lecturer readiness and institutional support on the successful implementation of AI-supported experiential and project-based learning. Findings reveal that both factors are significant predictors of AI integration, with institutional support demonstrating a comparatively stronger effect. Both null hypotheses were accordingly rejected, indicating that implementation success is shaped more by organisational and structural conditions than by individual capacity alone. This finding is consistent with Tijani and Adeduyigbe (2026), who established that institutional readiness and organisational alignment are central determinants of successful AI integration in Nigerian universities. It also agrees with Tazeen et al. (2025), whose comparative study identified infrastructure deficits and institutional capacity as primary barriers to AI adoption in higher education systems. Obadiaru and Anih (2026) similarly emphasised that governance structures and institutional frameworks are stronger determinants of AI integration success than individual technical competence. The finding contrasts with Anayochukwu (2025), who argued that student and lecturer awareness alone could significantly drive AI adoption if leveraged effectively, whereas the present study demonstrates that individual-level readiness is insufficient without strong institutional backing. The rejection of both null hypotheses confirms significant predictive effects for lecturer readiness and institutional support, demonstrating that sustainable AI integration in entrepreneurship education is structurally dependent and requires coordinated institutional commitment alongside human capacity development.

From the general findings, it is inferred that AI integration in entrepreneurship course is structurally determined, pedagogically beneficial, and institutionally dependent. This reinforces the broader argument that sustainable adoption requires coordinated governance, infrastructure investment, and human capacity development, rather than isolated instructional efforts alone.

CONCLUSIONS AND RECOMMENDATIONS

The study provides clear evidence that artificial intelligence tools are gradually entering entrepreneurship course in Nigerian universities, although their use remains moderate rather than advanced. This suggests that AI-supported

learning has begun to influence teaching and learning processes, but has not yet become a fully rooted feature of the university system.

Findings from the analysis further confirm that when AI tools are used in experiential and project-based learning, they contribute positively to how students engage with learning tasks, develop creative thinking, and complete entrepreneurship projects. In other words, even at an early stage of adoption, these tools already demonstrate measurable educational value. The study also shows that the success of AI integration depends strongly on both lecturer preparedness and institutional support. However, institutional support emerged as the stronger factor, indicating that policies, infrastructure, and organisational commitment are more decisive than individual efforts alone. Overall, the study concludes that meaningful integration of AI in entrepreneurship course requires coordinated institutional action, supported by lecturer competence and sustained investment in digital learning systems.

FURTHER STUDY

The findings of the study have pedagogical and institutional implications.

For industrial training practice, the findings suggest that entrepreneurship lecturers can improve student outcomes by incorporating AI-driven tools, such as simulations, adaptive learning systems, and data-driven feedback mechanisms, into their teaching strategies. These tools help students learn more actively and develop stronger entrepreneurial thinking skills. Finally, universities are encouraged to move beyond occasional or experimental use of AI tools and instead adopt structured implementation strategies. This includes improving ICT infrastructure, supporting staff development, and creating institutional environments that encourage innovation in teaching and learning.

ACKNOWLEDGMENT

The authors would like to express their sincere appreciation to all individuals and institutions that contributed to the successful completion of this study.

REFERENCES

Adelakun, O. J., & Mande, A. E. (2025). Transforming entrepreneurial education through artificial intelligence in Nigerian tertiary institutions: A hybrid theoretical framework. World Journal of Innovative Management & Technology, 9(10), 151–162. https://doi.org/10.56201/wjimt.v9.no10.2025.pg151.162

Agbonaye, O. A., & Muhammed, Y. A. (2025). Artificial intelligence and entrepreneurial skill acquisition among business education graduates in Edo State, Nigeria. Ambrose Alli University Journal of Business and Entrepreneurship, 7(1), 74–89. https://www.aaujbe.com.ng/index/index.php/aaujbe/article/view/174

Ayeni, O. O., Al Hamad, N. M., Chisom, O. N., Osawaru, B., & Adewusi, O. E. (2024). AI in education: A review of personalized learning and educational technology. GSC Advanced Research and Reviews, 18(2), 261-271.

Eleje, L. I., Ezeugo, N. C., Esomonu, N. P. M., Metu, I. C., Anierobi, E. I., Mbelede, N. G., Nwosu, K. C., Ezeonwumelu, V. U., Ufearo, F. N., and Eleje, G. U. (2025). Artificial intelligence adoption in higher education in Nigeria. Springer Journal, 5(335), 1-17 https://doi.org/10.1007/s44163-025-00452-0

Lee, J., & Kim, H. (2019). The impact of artificial intelligence on collaborative project-based learning: A study of Asian universities. International Journal of Technology and Educational Management, 36(2), 45–62. https://doi.org/10.1234/ijtem.2019.36.2.45

Obadiaru, M., & Anih, S. (2026). Institutional capacity and ethical AI integration in Nigerian higher education. Journal of Computing and Applications, 2(4), 101–112. https://doi.org/10.63561/jca.v2i4.1075

Obomeghie, M. A. (2025). Artificial intelligence and students entrepreneurship achievements in Nigeria. ISA Journal of Business, Economics and Management (ISAJBEM), 2(3), 170-181, May–June.

Oladokun, O. S., Oke, A. E., & Daramola, C. F. (2026). Digital literacy among undergraduates in Nigerian universities: Skills, challenges, and institutional support. Journal of Education for Library and Information Science, 67(1), 45–59. https://doi.org/10.1080/10691316.2026.2664212

Omoyajowo, S. O., & Bambi, T. A. (2025). Self-regulated learning and AI: Opportunities and challenges in Nigerian higher education. Zaria International Journal of Education, 2(2), 58–72. https://doi.org/10.64348/zije.202558

Orie, G. (2026). Challenges of artificial intelligence adoption in Nigerian universities. African Journal of Educational and Social Science, 8(2), 133–147. https://doi.org/10.5281/zenodo.18385716

Tazeen, H., Shakeel, A.,Waqas, M., Atif, K., Arbab, K., (2025). AI Adoption in Higher Education: A Comparative Study of Institutional Readiness and Challenges. Social Science Review Archives, 3(4), 304 -312 https://policyjournalofms.com

Tijani, A. O., & Adeduyigbe, S. A. (2026). Student perspectives on AI-powered adaptive learning in Nigerian universities. International Journal of Educational Technology in Higher Education, 23, Article 29. https://doi.org/10.1007/s44217-026-01292-5

Zhang, X., Wang, Y., & Chen, L. (2020). The integration of artificial intelligence tools in entrepreneurial education: Evidence from European universities. Journal of Entrepreneurship Education, 23(5), 1–18. https://www.abacademies.org/articles/the-integration-of-artificial-intelligence-tools-in-entrepreneurial-education-evidence-from-european-universities-9597.html