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EFFECT OF ARTIFICIAL INTELLIGENCE EXPLORATORY GEOMETRY MODULE ON CREATIVITY AND PROBLEM-SOLVING SKILLS AMONG IMO STATE UNIVERSITY UNDERGRADUATES

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Abstract
The increasing integration of artificial intelligence (AI) into education presents opportunities to enhance teaching and learning by fostering creativity and problem-solving skills. The study centered on Comparative Effect of Artificial Intelligence-guided Exploratory Geometry Module on creativity and problem-solving skills among undergraduates at Imo State University and Alvan Ikoku Federal University of Education. The study adopted a quasi-experimental, pretest–posttest control group design. This design was considered appropriate because it allowed comparison between students exposed to the Artificial Intelligence (AI)-guided exploratory geometry module and those taught using traditional instruction approach. Three research questions guided the study and three hypotheses were formulated for the study. The population comprised all second-year and third year undergraduate students enrolled in mathematics and mathematics education courses at Imo State University, Owerri and Alvan Ikoku federal university of education from 2022-2025 academic session. This population was chosen because geometry (including plane shapes) is a compulsory component of their curriculum at this level. A sample of 120 undergraduate students was selected using simple random sampling technique from the department of mathematics. Thereafter, the respondents from Alvan Ikoku Federal University of Education were assigned into an experimental group (n = 60) whereas respondents from Imo State University were assigned into a control group (n = 60). Two validated instruments were used to collect data: the Geometry Creativity Test (GCT) and the Complex Problem-Solving Test (CPST). Reliability was established using Kuder Richardson 21 which yielded coefficients of 0.82 (GCT) and 0.85 (CPST).Data were analyzed using both descriptive statistics (mean and standard deviation) to answer research questions, and Analysis of Covariance (ANCOVA) to determine differences between experimental and control groups. Findings revealed that the AI-guided exploratory geometry module is significantly more effective than traditional instructional approach in improving creativity, and complex problem-solving among undergraduates. The study recommends, among others, that Imo State University and Alvan Ikoku University of Education should invest in digital infrastructure, such as reliable internet connectivity, computer laboratories, and AI-enabled educational platforms. Access to these resources will ensure that both lecturers and students can engage meaningfully with AI-powered modules without technological barriers.

Keywords: Artificial Intelligence, creativity, problem-solving ability, and traditional instructional approach.

Introduction

The 21st century has witnessed rapid technological advancements that have profoundly impacted teaching and learning processes worldwide. Among these innovations, Artificial Intelligence (AI) has emerged as a transformative force in higher education. Artificial Intelligence, which involves simulating human cognitive functions by machines, is increasingly being integrated into instructional systems to personalize learning, enhance critical thinking, and foster creativity (Luckin et al., 2016; Holmes, Bialik, & Fadel, 2019). Artificial Intelligence refers to the capability of computer systems or software to perform tasks that normally require human intelligence, such as reasoning, learning, perception, and decision-making (Russell & Norvig, 2021). In education, AI encompasses adaptive learning systems, intelligent tutoring systems, and machine-learning algorithms that personalize instruction, provide feedback, and guide learners through problem-solving processes (Luckin et al., 2016).In the context of this study, Artificial Intelligence represents the digital system that provides adaptive guidance, real-time feedback, and interactive support to students while learning geometry concepts.AI-supported learning environments have the potential to revolutionize how students engage with abstract concepts—particularly in fields such as geometry, where visualization, exploration, and reasoning are essential for understanding complex spatial relationships.

In the Nigerian educational system,especially in Imo State University (IMSU), geometry remains a foundational component of mathematics and related disciplines such as engineering, architecture, computer science, and education. Despite its importance, research has shown that many university graduates exhibit low levels of creativity, critical thinking, and problem-solving skills when applying geometric concepts to real-world challenges (Okonkwo & Umeh, 2019; Afolabi, 2017). Traditional instructional approaches, often characterized by rote learning and teacher-centered delivery, have been insufficient in promoting deep understanding and innovative thinking among learners. Consequently, there is an urgent need for instructional innovations that can foster active engagement, self-directed inquiry, and higher-order cognitive development.

An Exploratory Geometry Module is an interactive instructional package designed to enable learners to investigate, manipulate, and visualize geometric concepts through exploration and discovery rather than rote learning. It integrates dynamic geometry software (such as GeoGebra, Cabri, or AI-supported platforms) that allows students to test conjectures, observe patterns, and construct geometric relationships independently (Hollebrands, 2007).In this study, it refers to a computer-based geometry learning module enhanced with AI functions that guide learners through explorations, provide hints, and assess their reasoning paths. An AI-Guided Exploratory Geometry Module combines artificial intelligence with exploratory learning in geometry. It uses intelligent algorithms to adapt to students' individual learning needs, offer automated feedback, generate hints, and provide dynamic visual representations to support inquiry-based learning (VanLehn, 2011).One promising pedagogical approach is the use of exploratory geometry modules, which allow students to learn geometry through interactive, discovery-oriented activities. Such modules encourage learners to construct knowledge by manipulating geometric figures, testing hypotheses, and observing relationships dynamically rather than passively receiving information (Hollebrands, 2007; Jones, 2000). When enhanced with artificial intelligence, these modules become AI-guided exploratory geometry environments, capable of adapting to individual learning needs, providing real-time feedback, diagnosing misconceptions, and suggesting personalized learning paths (VanLehn, 2011; Woolf, 2010). In an AI exploratory geometry module, students are not merely passive recipients of information but active participants in a digital learning ecosystem that supports experimentation and reflection. The AI system can analyze learners' problem-solving behaviors, recommend targeted hints, and encourage alternative solution strategies—key processes that stimulate creativity and problem-solving skills (Runco & Jaeger, 2012). Through this adaptive and interactive approach, learners develop a deeper conceptual understanding of geometric principles while cultivating flexibility in thinking and the ability to generate innovative solutions to unfamiliar problems.

Creativity is the ability to produce original, novel, and valuable ideas or solutions by combining existing knowledge in unique ways (Runco & Jaeger, 2012). In education, it involves generating new approaches to learning tasks, constructing innovative problem-solving methods, and thinking

divergently beyond standard procedures. Within this study, creativity refers to graduates' capacity to apply geometric knowledge in innovative ways, propose multiple solutions, and develop original ideas when faced with unfamiliar problems through the AI-guided module. The concepts of creativity and problem-solving are critical competencies for 21st-century graduates. Creativity involves the capacity to produce original, novel, and valuable ideas by combining existing knowledge in unique ways (Torrance, 1988; Runco & Jaeger, 2012).

Problem-solving skills refer to the cognitive and metacognitive processes individuals use to identify, analyze, and resolve complex or unfamiliar tasks. It involves understanding the problem, devising a plan, executing the plan, and evaluating the results. In mathematical and geometrical contexts, it requires reasoning, pattern recognition, and application of concepts to new situations (Schoenfeld, 2016). In this study, problem-solving skills denote the graduates' ability to apply logical and analytical thinking to find effective solutions to geometric problems presented through the AI-guided module. Problem-solving, on the other hand, encompasses a systematic process of identifying a problem, formulating strategies, implementing solutions, and evaluating outcomes (Schoenfeld, 2016). Both skills are essential for employability, research innovation, and sustainable development—particularly in Nigeria's rapidly changing knowledge economy (UNESCO, 2019). Yet, there is limited empirical research exploring how emerging technologies like AI can foster these higher-order skills among Nigerian university graduates.

Alvan Ikoku Federal University of Education (AIFUE) and Imo State University (IMSU) undergraduates refer to individuals who have not completed their degree programs at Alvan Ikoku Federal University of Education Owerri and Imo State University, Owerri, Nigeria. As university undergraduates, they are expected to demonstrate high levels of intellectual competence, creativity, and analytical reasoning in addressing academic, professional, and real-life challenges (NUC, 2021).In this study, they constitute the population through which the effect of the AI-guided exploratory geometry module on creativity and problem-solving skills will be examined. For undergraduates of AIFUE and Imo State University, the ability to think creatively and solve complex problems is particularly crucial, given the university's mission to produce self-reliant, innovative, and employable individuals who can contribute meaningfully to societal development (Imo State University, 2022). However, many undergraduates face difficulties translating theoretical mathematical knowledge into practical problem-solving contexts. The introduction of an AI exploratory geometry module offers a potential solution by providing a learning platform that blends artificial intelligence with exploratory and experiential learning to enhance students' creative and analytical capacities.

Empirical evidence suggests that AI-integrated instructional systems can improve problem-solving efficiency, and creative thinking (Luckin et al., 2016; OECD, 2019). However, most of these studies have been conducted in technologically advanced countries, leaving a gap in understanding the impact of such systems in developing educational contexts like Nigeria. Addressing this gap is critical for achieving Nigeria's national education goals, which emphasize technological innovation, skill acquisition, and sustainable development (Federal Ministry of Education, 2020).Therefore, this study seeks to examine the Imo State University undergraduates and those of Alvan Ikoku University of Education.. It aims to determine whether AI-supported exploratory learning can affect students' creativity and problem-solving skills in Imo State University and Alvan Ikoku Federal University of Education, whether innovative thinking and logical reasoning are more effective than traditional teaching approaches .For this study, it represents the intervention tool — a specially designed AI-driven platform that guides Imo State University undergraduates and those of Alvan Ikoku Federal University of Education through geometry problems, encouraging them to explore, hypothesize, and test ideas while receiving intelligent feedback and support.

Statement of the Problem

The teaching and learning of geometry, particularly plane shapes, continues to present challenges to undergraduates in Nigerian universities, especially Imo State University and Alvan Ikoku Federal University of Education. Evidence from course results and classroom observations indicates that

many students exhibit a shallow understanding of geometric concepts, limited creative reasoning, and struggle to apply knowledge to complex problem-solving tasks. Instead of engaging in exploratory thinking, students often resort to rote memorization of formulae for perimeter, area, and properties of shapes. This approach has limited their ability to generate innovative solutions and solve non-routine problems, which are critical skills in mathematics and related disciplines. Conventional teaching methods widely used in geometry instruction remain largely teacher-centered, focusing on repetitive drills, static diagrams, and procedural demonstrations. These methods offer minimal opportunities for students to explore, manipulate, and discover relationships within plane shapes independently. Consequently, undergraduate learners frequently show low levels of classroom participation, diminished persistence in solving tasks, and declining motivation toward mathematics courses. Such patterns point to a lack of creativity and problem-solving ability, which are essential for 21st-century learning outcomes. Globally, research has highlighted the potential of artificial intelligence (AI)-guided instructional modules to transform mathematics education. AI-driven systems can generate interactive visualizations, provide adaptive feedback, encourage multiple solution strategies, and sustain student interest through personalized guidance. However, within Nigerian higher education (Imo State University), there is a paucity of empirical studies investigating the effects of AI-guided exploratory geometry modules on undergraduate students' creativity and problem-solving skills in geometry learning. The absence of such research creates a critical gap in knowledge, leaving lecturers with limited evidence on the effectiveness of innovative AI-driven approaches compared to traditional instruction. The problem of this study, therefore, is the persistent difficulty among AIFUE and Imo State University undergraduates in developing creativity, solving complex geometry problems, and sustaining engagement, and the lack of empirical evidence on whether AI-guided exploratory geometry modules can address these challenges.

Research Questions

The following research questions guided the study:

1. What is the effect of the Artificial Intelligence-guided exploratory geometry module on undergraduate students' creativity in plane shapes compared to traditional instruction approach?
2. How does the Artificial Intelligence-guided exploratory geometry module affect undergraduate students' complex problem-solving skills in plane shapes compared to traditional instruction approach?
3. What is the interaction effect in combining the Artificial Intelligence-guided exploratory geometry module on students' creativity, complex problem-solving and traditional instruction approach?

Hypotheses

The following null hypotheses (Ho) were tested at 0.05 level of significant in the study

H_{o1}: There is no significant effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity in plane shapes compared to traditional instruction approach.

H_{o2}: There is no significant effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' complex problem-solving skills in plane shapes compared to traditional instruction approach.

H_o3: There is no significant effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity, problem-solving skills and traditional instruction approach.

Methodology

The study adopted a quasi-experimental, pretest–posttest control group design. This design was considered appropriate because it allowed comparison between students exposed to the Artificial

Intelligence (AI)-guided exploratory geometry module and those taught using conventional instruction. Three research questions and three hypotheses were formulated for the study. The population comprised all second-year and third year undergraduate students enrolled in mathematics and mathematics education courses at Imo State University, Owerri and Alvan Ikoku Federal University of Education from 2022-2025 academic session. This population was chosen because geometry (including plane shapes) is a compulsory component of their curriculum at this level. A sample of 120 undergraduate students was selected using simple random sampling technique from the department of mathematics. Thereafter, the respondents from Alvan Ikoku Federal University of Education were assigned into an experimental group (n = 60) whereas respondents from Imo State University were assigned into a control group (n = 60). Two validated instruments were used to collect data: the Geometry Creativity Test (GCT) and the Complex Problem-Solving Test (CPST). Reliability was established using Kuder Richardson 21 which yielded coefficients of 0.82 (GCT) and 0.85 (CPST).The experimental group received instruction through an AI-guided exploratory geometry module for six weeks (2-hours per week). The module integrated features such as adaptive hints, generative plane-shape diagrams, and exploratory tasks that encouraged multiple solution strategies. The control group was taught the same content using conventional method without AI support. Both groups covered identical content in plane shapes (properties, constructions, area, perimeter, and applications). Trained instructors implemented the lessons to minimize teacher bias. The researcher monitored the exercise using a treatment implementation checklist. Pretests were administered to both groups before the intervention. Posttests were conducted after six weeks of instruction. Data were analyzed using both descriptive statistics (mean and standard deviation) to answer research questions, and Analysis of Covariance (ANCOVA) to determine differences between experimental and control groups.

Results

Research Question One: What is the effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity in plane shapes compared to traditional instruction approach?

Table 1: Mean and standard deviation of students' creativity using plane shapes

		Pretest		Posttest		
Group	N	Mean	S.D	Mean	S.D	Mean difference
Experimental	30	66.4667	19.74621	80.2667	9.55179	13.8
Control	30	47.3333	9.42972	55.2333	8.50429	7.9

Table 1 shows that the experimental groups mean score and standard deviation for pretest were 66.47 and 19.75, post test were 80.27 and 9.55 respectively. In comparison, the control group had a mean score of 47.33 and a standard deviation of 9.43 for pretest ,while the post tests were 55.23 and 8.50.The calculated mean difference of 13.8 for experimental and 7.9 for control group. From the results in table 1 the experimental group had higher mean score compared to their counterparts.

Research Question Two: How does the Artificial Intelligence guided exploratory geometry module affect undergraduate students problem-solving skills in plane shapes compared to traditional instruction approach?

Table 2: Mean and standard deviation of students' problem-solving skills using plane shapes

		Pretest		Posttest		
Group	N	Mean	S.D	Mean	S.D	Mean difference
Experimental	30	64.7000	13.42193	80.1333	10.41793	15.4333
Control	30	43.5000	8.80732	51.6333	8.83755	8.1333

Table 3 shows that the experimental groups mean score and standard deviation for pretest were 64.70 and 13.42 post test were 80.13and 10.42 respectively. In comparison, the control group had a mean score of 43.50 and a standard deviation of 8.81 for pretest ,while the post test were 51.63 and 8.84.The calculated mean difference of 15.43 for experimental and 8.1 for control group. From the result in table 2 the experimental group had a significantly higher mean score compared to their counterparts.

Research Question Three: Are there any interaction effect in the combined of the Artificial Intelligence-guided exploratory geometry module on students' creativity, problem-solving and traditional instruction method?

Table 3: Mean and standard deviation of students exposed to Experimental groups and control groups using plane shapes

Descriptive Statistics

Groups	Mean	Standard Deviation	N
Creativity	80.1333	10.41793	30
Traditional instruction approach	51.6333	8.83755	30
Problem-solving	80.2667	9.55179	30
Traditional instruction approach	55.2333	8.50429	30
Total	66.8167	16.35837	120

The results in table 3 shows the mean and SD scores are 80.13 and 10.42 respectively for creativity (experimental group).Also, the mean and SD scores are 51.63 and 8.84 respectively for traditional instruction approach (control group).While the mean and SD scores are 80.27 and 9.55 respectively for problem -solving (experimental group).Finally. the mean and SD scores are 55.23 and 8.50 respectively for traditional instructional approach (Control group).From table 3, the result shows that students exposed to experiment had a higher scores than those in traditional instruction approach (control groups).

Hypotheses

Table 4: Summary of Analysis of Covariance (ANCOVA) on the effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity and plane shapes compared to traditional instruction approach.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9402.781[a]	2	4701.391	56.530	.000
Intercept	17940.535	1	17940.535	215.719	.000
VAR00001	2.765	1	2.765	.033	.856
VAR00003	6591.683	1	6591.683	79.259	.000
Error	4740.469	57	83.166		
Total	289547.000	60			
Corrected Total	14143.250	59			

a. R Squared = .665 (Adjusted R Squared = .653)

Table 4 shows **e**ffect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity in plane shapes compared to traditional instruction approach**.** However, the result indicated that there is a significant effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity in plane shapes compared to traditional instruction approach (F1,57=79.259,P=0.00.Hence,null hypothesis one was rejected at a 0.05 level of significance.

Table 5: Summary of Analysis of Covariance (ANCOVA) on the effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' complex problem-solving skills in plane shapes compared to traditional instruction approach.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12183.946[a]	2	6091.973	64.159	.000
Intercept	10721.231	1	10721.231	112.913	.000
VAR00001	.196	1	.196	.002	.964
VAR00003	6454.582	1	6454.582	67.978	.000
Error	5412.237	57	94.952		
Total	278033.000	60			
Corrected Total	17596.183	59			

a. R Squared = .692 (Adjusted R Squared = .682)

Table 5 shows effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' problem-solving in plane shapes compared to traditional instruction approach**.** However, the result indicated that there is a significant effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' problem-solving in plane shapes compared to traditional instruction approach (F1,57=67.978,P=0.00.Hence,null hypothesis two was rejected at a 0.05 level of significance.

Table 6: Summary of Analysis of Covariance (ANCOVA) on the effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity, problem-solving skills and traditional instruction approach.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	21689.463[a]	4	5422.366	61.408	.000
Intercept	28909.754	1	28909.754	327.404	.000
VAR00001	1.163	1	1.163	.013	.909
VAR00003	13580.801	3	4526.934	51.268	.000
Error	10154.503	115	88.300		
Total	567580.000	120			
Corrected Total	31843.967	119			

a. R Squared = .681 (Adjusted R Squared = .670)

Table 6 shows effect of the combined effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity, problem-solving skills and traditional instruction approach. However, the result indicated that there is a significant effect of the combined effect of the Artificial Intelligence guided exploratory geometry module on undergraduate students' creativity , problem-solving skills and traditional instruction approach (F1,115=51.268,P=0.00.Hence,null hypothesis three was rejected at a 0.05 level of significance.

Discussion of Findings

The findings showed that undergraduate students exposed to the module demonstrated greater ability to think divergently, generate multiple solution strategies, and create novel representations of geometric problems compared to those taught through traditional instruction approach . This improvement in creativity can be attributed to the exploratory nature of the AI module, which provided opportunities for learners to manipulate shapes, visualize relationships dynamically, and test alternative solutions with immediate feedback. The study aligns with findings by Holmes, Bialik, and Fadel (2019), who argued that AI-powered learning environments enhance students' higher-order thinking by adapting tasks to individual learners' needs. Similarly, Alalwan, Cheng, and Al-Samarraie (2022) reported that AI applications in education stimulate creative reasoning by offering personalized,

open-ended tasks and guiding students to reflect on alternative solution methods. The present study provides empirical support for these claims within the Nigerian higher education context, specifically in geometry education. The study's findings also highlight the potential of AI to address long-standing concerns in Nigeria's mathematics education system, where learners are often constrained by rigid, exam-driven teaching methods. By shifting the learning process toward discovery, innovation, and reflective thinking, the AI-guided module demonstrates that undergraduate students can indeed develop the creative skills necessary for success in mathematics and beyond.

Secondly. the findings showed that undergraduates students exposed to the AI-guided exploratory geometry module demonstrated significant improvement in their ability to solve complex geometry problems compared to their peers taught with traditional instruction approach. Students were able to break down non-routine problems into smaller steps, apply multiple strategies, and persist in working toward solutions even when initial attempts were incorrect. The study aligns with the findings of Jonassen (2000), who argued that technology-enhanced exploratory environments foster problem-solving by encouraging students to analyze, synthesize, and evaluate alternative solutions. Similarly, Kose (2020) found that AI-powered platforms improve students' problem-solving skills by allowing learners to test multiple solution pathways and receive immediate feedback on errors. The present study extends these findings to the Nigerian higher education context, demonstrating that AI modules can reduce the over-reliance on rote formula application and support students in tackling multi-step geometry tasks that require higher-order reasoning.

Finally, the findings of this study revealed a significant difference in the combined effect of the AI-guided exploratory geometry module and the traditional instruction approach on undergraduate students' creativity and complex problem-solving in plane shapes. Students taught with the AI-guided module outperformed those taught with traditional instruction approach across all three domains, suggesting that AI-powered exploratory learning provides a more holistic improvement in higher-order cognitive and affective outcomes. One reason for this difference is that lecture-based methods in Nigerian university classrooms are typically teacher-centered and focused on procedural demonstrations. While such methods can convey factual knowledge, they often limit opportunities for divergent thinking, problem exploration, and sustained participation (Nkwocha & Okigbo, 2021). In contrast, the AI-guided module created an interactive, adaptive, and student-centered learning environment, which encouraged students to generate original ideas, persist with non-routine tasks, and actively engage with learning materials. This finding is consistent with Holmes, Bialik, and Fadel (2019), who emphasized that AI tools can personalize learning, stimulate creativity, and enhance student engagement by adapting tasks to individual learners' needs. Similarly, Jonassen (2000) argued that technology-enhanced environments support meaningful problem-solving by providing learners with exploratory spaces to test, refine, and evaluate alternative solutions. The present study extends these insights by empirically demonstrating that AI-guided modules produce not only isolated improvements in creativity and a combined, synergistic effect across multiple learning outcomes.

Conclusion

The study centered on Effect of Artificial Intelligence-guided Exploratory Geometry Module on creativity and problem-solving skills among undergraduates at Imo State University and Alvan Ikoku university of education. From the findings of the study, students who were exposed to the AI-guided module did noticeably better than their peers who were taught via traditional instruction approach.. By allowing students to develop numerous solution strategies, interactively explore plane designs, and use flexible reasoning beyond rote memory, the AI-guided module promoted creativity. The AI system's exploratory tasks and adaptive feedback helped learners solve complicated problems by

breaking down non-routine difficulties, persevering through challenging assignments, and creating methodical solution strategies. The traditional instructional approach, on the other hand, though effective in transmitting basic knowledge, was limited in stimulating higher-order thinking, problem-solving resilience, and active participation. Finally, the study demonstrates that the AI-guided exploratory geometry module is significantly more effective than traditional instructional approach in improving creativity and problem-solving among undergraduates. Its integration into mathematics instruction at Imo State University and other Nigerian universities presents a promising pathway for enhancing 21st-century skills, promoting deeper learning, and bridging long-standing gaps in geometry education.

Recommendations

Based on the findings and insights from the study, the following recommendations were made:

1. The Department of Mathematics and related faculties at Imo State University should incorporate AI-guided exploratory geometry modules into undergraduate geometry courses. This will provide students with adaptive feedback, generative visualizations, and exploratory tasks that promote creativity, problem-solving, and active engagement.
2. University management should organize regular training and workshops to equip lecturers with the knowledge and skills to effectively integrate AI technologies into teaching.
3. The university should invest in digital infrastructure, such as reliable internet connectivity, computer laboratories, and AI-enabled educational platforms. Access to these resources will ensure that both lecturers and students can engage meaningfully with AI-powered modules without technological barriers.

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