UTILIZATION OF ARTIFICIAL INTELLIGENT POWERED ADAPTIVE LEARNING SYSTEMS IN PROMOTING MARKETING EDUCATION IN TERTIARY INSTITUTIONS IN IMO STATE NIGERIA

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Abstract

The study examined the utilization of artificial intelligent powered adaptive learning systems in promoting marketing education in tertiary institutions in Imo State. It specifically centered on the extent to which AI-powered learner modelling, content customization, learning feedback mechanism, and data-driven instruction promote marketing education. The study employed descriptive survey research design. The population of the study comprised all the 48 marketing educators in the three tertiary institutions currently running marketing as a field of study in Imo State. The total population of the study were used which made it a census study. A structured questionnaire designed by the researchers was used for data collection. Data was collected through physical contact with the respondents. Data collected were analysed using mean scores. Analysis of the data collected revealed that artificial intelligent powered learner modelling, content customization, learning feedback mechanism, and data-driven instruction promote marketing education. It was therefore recommended that: government and institutions should develop clear policies that encourage innovation, provide funding incentives, and ensure quality assurance for artificial intelligent integration in higher education and beyond; government and institutions should invest in reliable electricity, internet connectivity, and access to devices, to bridge the digital gap; government and institutions should Implement comprehensive training initiatives to equip teachers with the necessary skills to effectively use and integrate artificial intelligent tools in their classrooms; and government and institutions should engage communities to raise awareness about the practical benefits of artificial intelligent in improving learning outcomes, overcoming cultural resistance.

Keywords: Artificial Intelligence, Adaptive Learning Systems, and Marketing Education

Introduction

Artificial intelligent powered adaptive learning systems utilize artificial intelligence to personalize educational experiences by adjusting content and pace to individual student needs and learning styles. According to Pliakos et al (2019), adaptive learning systems are personalised learning platforms that adapt to students' learning strategies, the sequence and difficulty of the task abilities, the time of feedback and students' preferences. They added that these platforms encourage students to monitor their learning journeys via automated feedback cycles within the systems, allowing them to progress independently of the course instructor. Park & Park (2018) demonstrated the effectiveness of adaptive learning systems powered by artificial intelligent algorithms in guiding students' learning pathways. According to the scholars these systems

analyse student interactions with content in real-time, offering personalized recommendations and scaffolding learning experiences to optimize comprehension and retention. AI-powered adaptive learning systems utilize learner modelling, content customization, learning feedback mechanism and data driven instruction to personalize the learning experience.

Artificial intelligent powered learner modelling is the process of creating and maintaining a representation of an individual learner's knowledge, skills, and preferences within a learning environment, particularly in computer-based systems. This model allows systems to personalize instruction and adapt to the learner's unique needs, leading to more effective and efficient learning. According to Gligorea et al (2023), learner modelling involves creating representations of individual learners, including their cognitive abilities, knowledge levels, learning styles, and preferences. Artificial intelligent based learner modelling involves using artificial intelligence techniques to create a profile of a student's knowledge, skills, and learning preferences. This profile can then be used to personalize learning experiences, provide targeted feedback, and adapt the curriculum to individual needs. artificial intelligent powered tools can analyse student data, identify learning patterns, and offer tailored recommendations, potentially leading to more effective and engaging learning. In artificial intelligent powered machine learning, learner modelling involves creating representations of individual learners to personalize learning experiences. Key components include data collection, algorithm selection, model training, and evaluation. These components work together to analyse learner behaviour, predict needs, and adapt content for optimal learning outcomes. Previous studies revealed that artificial intelligent powered learner modelling promotes marketing education by dynamically tailoring course content, pacing, and feedback to match each student's unique skills and learning pace. For instance, Schlegelmilch and Mills (2025) opine that generative and predictive artificial intelligent tools support cognitive engagement by challenging students with real-world marketing scenarios, boosting critical inquiry and problem-solving. They added that artificial intelligent models analyze student performance in real-time, adjusting marketing exercises, such as data analytics, consumer behavior simulations, or campaign design, to address individual knowledge gaps.

Artificial intelligent powered content customization in education, also known as personalized learning, involves tailoring educational content and learning experiences to meet the unique needs, skills, and learning styles of individual students. This approach moves away from a "one-size-fits-all" model to create a more engaging and effective learning environment. Garrick et al (2017) saw content customization as the use of data for tailoring online courses and curriculum materials. Artificial intelligent powered content customization in education tailors learning experiences to individual student needs, using artificial intelligence to analyse student performance and preferences to adjust lesson plans, difficulty levels, and resources in real-time. This approach fosters personalized learning, enhances engagement, and can lead to improved academic outcomes. artificial intelligent powered learning leverages many key components for content customization to create personalized learning experiences. These components include adaptive learning platforms, content generation, personalized recommendations, instant feedback, natural language processing, and accessibility features. Artificial intelligence analyses learner data to tailor content, provide targeted support, and adapt the learning path in real-time. Most scholars have found in their various studies that artificial intelligent powered content customization promotes marketing education by delivering tailored, adaptive learning experiences that match individual student needs and improve comprehension. For instance, Singh and Pathania (2024) postulates that customized digital ads, interactive modules, and real-time feedback boost student participation and retention of complex marketing concepts. In a related development, research conducted by Patel and Shah (2020) indicates that artificial intelligent driven content creation positively impacts student engagement in digital marketing education.

Artificial intelligent -powered learning feedback mechanisms in education provide personalized and timely feedback to students, enhancing their learning experience and helping them improve.

These systems leverage artificial intelligence algorithms to analyse student performance, identify areas of improvement, and offer tailored suggestions for study habits or specific exercises. According to Olasehinde (2025), artificial intelligent powered feedback systems can provide instantaneous, personalized, and context-specific feedback, tailored to individual learning needs. These systems are designed to analyse student performance, identify areas of improvement, and offer suggestions to enhance skills in real-time. artificial intelligent powered learning feedback mechanisms involve input analysis, pattern recognition, feedback generation, and adaptive learning. These components work together to provide personalized and timely feedback to learners, helping them improve their understanding and skills. Studies had it that artificial intelligent powered learning feedback mechanisms significantly improve marketing education by delivering real-time, personalized, and adaptive guidance that boosts student engagement and performance. For instance, Rakhmetov et al (2025) opine that students refining digital campaigns, consumer data analyses, or copywriting receive immediate critique, helping them bridge theoretical marketing concepts with real-world execution. Similarly, Benardo (2024) added that autonomous artificial intelligent feedback guides students to plan, monitor, and reflect on their own progress, fostering independent problem-solving skills.

Artificial intelligent powered data-driven instruction in education uses artificial intelligence and data analysis to personalize learning experiences and improve student outcomes. It involves using artificial intelligence tools to gather and analyse student performance data, identify learning gaps, and tailor instruction to meet individual needs. This approach allows educators to make informed decisions, personalize learning paths, and provide targeted support, leading to more effective and engaging learning experiences. Routh (2024) sees data-driven instruction as the process of tailoring instructional content to the learning levels or learning preferences of learners or students. Data-driven instruction, enhanced by artificial intelligence, involves using student performance data to personalize learning experiences. AI-powered tools can analyse data patterns, detect learning gaps, and provide tailored recommendations, leading to more effective and engaging educational outcomes. Scholars have also found positive effect of artificial intelligent Powered data driven instruction on marketing education. For instance, a study carried out by Taskin (2025) revealed that artificial intelligence powered, data-driven instruction significantly transforms marketing education by personalizing the student learning experience, bridging the gap between theory and modern industry practice, and enhancing overall academic engagement. The author further said that data-driven tools provide instant evaluations on student projects, essays, and simulated campaigns, allowing learners to quickly identify and correct gaps in their strategic understanding.

Marketing education provides individuals with the knowledge and skills necessary to understand and execute marketing strategies within businesses. It encompasses a wide range of topics, from foundational marketing concepts to specialized areas like digital marketing and brand management. According to Batshoun (2022), marketing education involves learning about the various components of marketing, including the market and the customers, the product, the competition, and a host of other elements that can help a business thrive. It covers a wide range of topics, including economics, finance, statistics, data analysis, psychology, and sociology. Like in other course of study, AI-powered adaptive learning systems are transforming marketing education by personalizing the learning experience and optimizing student engagement. Singh and Pathania (2024) maintained that in digital marketing education, adaptive learning systems can be used to customize educational materials, quizzes, and assignments to match each student's learning style and proficiency level. These systems leverage artificial intelligent algorithms to analyse student performance data and adjust the learning path in real-time, providing a more effective and engaging learning environment. This personalized approach can lead to improved learning outcomes and better prepare students for the demands of the digital marketing landscape.

Numerous studies have proved the effectiveness of using artificial intelligent powered adaptive learning systems in education. For instance, a study conducted by Ayeni et al (2024) revealed that artificial intelligent powered adaptive learning systems help achieve higher engagement, understanding, and memory in all students with learning disabilities, thereby lessening the educational gap between them and their peers. Another study conducted by Teslim (2024) revealed that artificial intelligent driven platforms not only promote sustainable learning by reducing resource dependency but also enhance learning outcomes and offer scalable solutions for growing educational demands. A study conducted by Luo and Hsiao-Chin (2023) revealed a significant positive association between the integration of artificial intelligent powered platforms and student outcomes. Students exposed to personalized learning experiences exhibited improved academic achievements compared to those in traditional classrooms. In a related development a study conducted by Sakhamuri (2023) revealed an unambiguous preference for adaptive learning systems among students compared with conventional methods, which is accompanied by heightened levels of motivation in adaptive learning system environments.

Despite the significant role of artificial intelligent powered adaptive learning systems in education, the government and private school owners in Nigeria seemed not to have given the needed attention to it in our schools. According to Al-Onyanabo (2024), artificial intelligence has significant potential to revolutionize Nigeria's education system by personalizing learning experiences, improving student engagement, and streamlining administrative processes. While artificial intelligence offers potential for personalized learning, individualized feedback, and enhanced student engagement in all courses, its widespread implementation in Nigeria tertiary institutions faces hurdles, due to significant infrastructure challenges, insufficient digital literacy, lack of trained educators, and excessive costs. It is against this background that the study sought to examine the utilization of artificial intelligent powered adaptive learning systems in promoting marketing education in tertiary institutions in Imo State Nigeria.

Statement of the Problem

Marketing education is highly relevant for both individuals and organizations, as it provides a foundation for understanding consumer behaviour, developing effective marketing strategies, achieving business objectives, enhancing career prospects, and contributing to economic growth by fostering innovation and competitiveness. Despite the significant role of marketing in economic development, there are lapses in the delivery of its contents in our tertiary institutions, as the school facilities and conventional teaching techniques of delivery marketing courses in our tertiary institutions are not yielding the desired results. Thus, marketing education in Nigeria faces problems of inadequate and irrelevant curriculum, shortage of qualified marketing educators, lack of practical industry interaction, poor infrastructure and facilities, and general perception issue where marketers' value is underestimated. These have resulted to decline in students' enrolment, shortage of qualified marketers in key sectors, poorly defined professional status for marketers, and a general negative perception of marketing as a career path. Hence, the need to examine the utilization of artificial intelligent powered adaptive learning systems in promoting marketing education in tertiary institutions in Imo State Nigeria.

Purpose of the Study

The main purpose of the study was to examine the utilization of artificial intelligent powered adaptive learning systems in promoting marketing education in tertiary institutions in Imo State Nigeria. Specifically, the study aimed at examining:

1. The extent to which artificial intelligent powered learner modelling promotes marketing education in tertiary institutions in Imo State.
2. The extent to which artificial intelligent powered content customization promotes marketing education in tertiary institutions in Imo State.
3. The extent to which artificial intelligent powered learning feedback mechanism promotes marketing education in tertiary institutions in Imo State.

4. The extent to which artificial intelligent powered data-driven instruction promotes marketing education in tertiary institutions in Imo State.

Research Questions

The study was guided by the following questions.

1. To what extent do artificial intelligent powered learner modelling promote marketing education in tertiary institutions in Imo State?
2. To what extent does artificial intelligent powered content customization promote marketing education in tertiary institutions in Imo State?
3. To what extent does artificial intelligent powered learning feedback mechanism promote marketing education in tertiary institutions in Imo State?
4. To what extent does artificial intelligent powered data-driven instruction promote marketing education in tertiary institutions in Imo State?

Methodology

Design of the Study

The study employed descriptive survey research design. According to Singh (2023), descriptive research is an exploratory research method that helps a researcher describe a population, circumstance, or phenomenon. The design is suitable for the study as the study explored the facts pertaining the utilization of artificial intelligent powered adaptive learning systems in promoting marketing education in tertiary institutions.

Population of the Study

The population of the study comprised the 48 (forty-eight) marketing educators in the three tertiary institutions currently running marketing programme in Imo State Nigeria. The population distribution of respondents is presented in table 1 below.

Table 1: Population Distribution of Respondents

S/N	Name of Institution	Population
1.	Federal Polytechnic Nekede, Imo State	19
2.	Kingsley Ozumba Mbadiwe University Ideato, Imo State	13
3.	Imo State University Owerri, Imo State.	16
	Total	**48**

Source: *Department of Marketing of the various Institutions (2025)*

Sample and Sampling Technique

The entire population of the study was used, which make it a census study. Thus, no sampling technique was adopted due to the manageable size of the population.

Instrument for Data Collection

The instrument used for data collection was a structured questionnaire designed by the researchers. The instrument was divided into two sections (section A and B). Section A of the instrument contained personal data of the respondents, while section B contained 20 items generated in line with the specific objectives of the study, with response options of four Likert scales of Very High Extent (VHE), High Extent (HE), Low Extent (LE), and Very Low Extent (VLE).

Validity of the Instrument

The instrument was validated by Measurement and Evaluation professionals in the researchers' institution. Their comments and corrections were considered in the final draft of the instrument to ensure its face, construct and content validity.

Reliability of the Instrument

The reliability of the instrument was determined with test re-test. It was performed by administering 10 (ten) copies of the instrument two consecutive times within a space of two

weeks. The results of the two tests were later compared using Pearson product moment correlation coefficient formula. A coefficient of 0.83 was obtained which guaranteed it reliability.

Method of Data Collection

Data were collected for the study through physical contact with the respondents. The 48 copies of the instrument were administered, and 100% retrieval was recorded.

Method of Data Analysis

Data collected were analysed with descriptive Mean. Decision was made by comparing the calculated mean scores with criteria mean score which was obtained by dividing the sum of the rating scale by the number of scales {4+3+2+1/4 = 2.50}. All the Calculated mean scores in the analysis were greater than the criteria mean score of 2.50, and they were accepted.

Results

Research question one

To what extent does artificial intelligent powered learner modelling promote marketing education in tertiary institutions in Imo State?

In response to the above research question, item 1 to 6 of the questionnaire administered to the respondents were subjected to mean Analysis. The summary of the analysis is presented in table 2 below.

Table 2: Mean analysis of the extent artificial intelligent powered learner modelling promotes marketing education

S/N	Item	VHE 04	HE 03	LE 02	VLE 01	Total 10	Mean 2.50	Decision
1.	Marketing education can be promoted through personalized and adaptive learning paths.	21 84	27 81	00 00	00 00	48 165	3.44	Accepted
2.	Marketing education can be promoted through offering of tailored content and pace.	17 68	23 69	02 04	06 06	48 147	3.06	Accepted
3.	Marketing education can be promoted through real-time analytics and feedback for immediate support.	16 64	28 84	03 06	01 01	48 155	3.23	Accepted
4.	Marketing education can be promoted through predictive insights into student performance and needs.	18 72	26 78	00 00	04 04	48 154	3.21	Accepted
5.	Marketing education can be promoted through automated grading and administrative tasks for efficiency.	22 88	26 78	00 00	00 00	48 166	3.46	Accepted
6.	Marketing education can be promoted by using natural language processing for conversational interaction and content analysis.	17 68	23 69	05 10	03 03	48 150	3.13	Accepted
	Total Mean Score	18 72	26 78	02 04	02 02	48 156	3.25	Accepted

Source: *Field work/survey, 2025*

Table 2 above revealed a calculated weighted mean of 3.25 which is greater than the criteria mean of 2.50. Since the calculated total mean is greater than the criteria mean (3.25 > 2.50), it is concluded that, to a very high extent, artificial intelligent powered learner modelling promotes marketing education in tertiary institutions in Imo State.

Research question two

To what extent does artificial intelligent powered content customization promote marketing education in tertiary institutions in Imo State?

In response to the above research question, item 7 to 10 of the questionnaire administered to the respondents were subjected to mean Analysis. The summary of the analysis is presented in table 3 below.

Table 3: Mean analysis of the extent artificial intelligent powered content customization promotes marketing education

S/N	Item	VHE 04	HE 03	LE 02	VLE 01	Total 10	Mean 2.50	Decision
7.	Marketing education can be promoted by using predictive analytics and behavioural analysis.	23 92	21 63	00 00	04 04	48 159	3.31	Accepted
8.	Marketing education can be promoted by using real-time personalization to adapt content dynamically.	27 108	21 63	00 00	00 00	48 171	3.56	Accepted
9.	Marketing education can be promoted by using natural language processing for human-like text.	19 76	26 78	02 04	01 01	48 159	3.31	Accepted
10.	Marketing education can be promoted by using recommendation engines for tailored suggestions.	20 80	24 72	02 04	02 02	48 158	3.29	Accepted
	Total	22 88	23 69	01 02	02 02	48 161	3.35	Accepted

Source: *Field work/survey, 2025*

Table 3 above revealed a calculated weighted mean of 3.35 which is greater than the criteria mean of 2.50. Since the calculated weighted mean is greater than the criteria mean (3.35 > 2.50), it is concluded that, to a very high extent, artificial intelligent powered content customization promotes marketing education in tertiary institutions in Imo State.

Research question three

To what extent does artificial intelligent powered learning feedback mechanism promote marketing education in tertiary institutions in Imo State?

In response to the above research question, items 11 to 15 of the questionnaire administered to the respondents were subjected to mean Analysis. The summary of the analysis is presented in table 4 below.

Table 4: Mean analysis of the extent artificial intelligent powered learning feedback mechanism promotes marketing education

S/N	Item	VHE 04	HE 03	LE 02	VLE 01	Total 10	Mean 2.50	Decision
11.	Marketing education can be promoted through customized assessments.	22 88	21 63	05 10	00 00	48 161	3.35	Accepted
12.	Marketing education can be promoted through intelligent tutoring.	20 80	21 63	04 08	03 03	48 154	3.21	Accepted
13.	Marketing education can be promoted through detailed diagnostics for writing and other tasks.	19 76	23 69	02 04	04 04	48 153	3.19	Accepted
14.	Marketing education can be promoted through reduction of grading bias.	22 88	22 66	00 00	04 04	48 158	3.29	Accepted
15.	Marketing education can be promoted through continuous monitoring of progress.	28 112	18 54	02 04	00 00	48 170	3.54	Accepted
	Total	22 88	21 63	03 06	02 02	48 159	3.31	Accepted

Source: *Field work/survey, 2025*

Table 4 above revealed a calculated weighted mean of 3.31 which is greater than the criteria mean of 2.50. Since the calculated weightedmean is greater than the criteria mean (3.31 > 2.50), it is concluded that, to a high extent, artificial intelligent powered learning feedback mechanism promotes marketing education in tertiary institutions in Imo State.

Research question four

To what extent do artificial intelligent powered data-driven instruction promote marketing education in tertiary institutions in Imo State?

In response to the above research question, item 16 to 20 of the questionnaire administered to the respondents were subjected to mean Analysis. The summary of the analysis is presented in table 5 below.

Table 5: Mean analysis of the extent artificial intelligent powered data-driven instruction promotes marketing education

S/N	Item	VHE 04	HE 03	LE 02	VLE 01	Total 10	Mean 2.50	Decision
16.	Marketing education can be promoted paths through adaptive content and real-time feedback.	23 92	21 63	00 00	04 04	48 159	3.31	Accepted
17.	Marketing education can be promoted through predictive analytics to identify struggling students.	24 96	22 66	01 02	01 01	48 165	3.44	Accepted
18.	Marketing education can be promoted through automated administrative tasks to boost teacher efficiency.	18 72	26 78	00 00	04 04	48 154	3.21	Accepted
19.	Marketing education can be promoted by enhancing students' engagement via interactive tools.	22 88	24 72	02 04	00 00	48 164	3.42	Accepted
20.	Marketing education can be promoted through curriculum enhancement by analysing performance data to optimize learning materials.	21 84	25 75	00 00	02 02	48 161	3.35	Accepted
	Total	22 88	23 69	01 02	02 02	48 161	3.35	Accepted

Source: *Field work/survey, 2025*

Table 5 above revealed a calculated weighted mean of 3.35 which is greater than the criteria mean of 2.50. Since the calculated weighted mean is greater than the criteria mean (3.35 > 2.50), it is concluded that, to a very high extent, artificial intelligent powered data-driven instruction promotes marketing education in tertiary institutions in Imo State.

Discussion of Findings

The analysis of the degree to which artificial intelligent powered learner modelling promotes marketing education, revealed that to a very high extent, artificial intelligent powered learner modelling promotes marketing education in tertiary institutions in Imo State. This finding agrees with the opinion of Schlegelmilch and Mills (2025). According to the scholars, generative and predictive artificial intelligent tools support cognitive engagement by challenging students with real-world marketing scenarios, boosting critical inquiry and problem-solving. They added that artificial intelligent models analyze student performance in real-time, adjusting marketing exercises, such as data analytics, consumer behavior simulations, or campaign design, to address individual knowledge gaps.

The analysis of the extent to which artificial intelligent powered content customization promotes marketing education, revealed that to a very high extent, artificial intelligent powered content customization triggers marketing education in tertiary institutions in Imo State. This finding concurs with the postulations of Singh and Pathania (2024) and Patel and Shah (2020). Singh and Pathania (2024) postulates that customized digital ads, interactive modules, and real-time feedback boost student participation and retention of complex marketing concepts. In a related development, research conducted by Patel and Shah (2020) indicates that AI-driven content creation positively impacts student engagement in digital marketing education.

The analysis of the degree to which artificial intelligent powered learning feedback mechanism promotes marketing education, revealed that to a very high extent, artificial intelligent powered learning feedback mechanism enhances marketing education in tertiary institutions in Imo State. This finding agrees with the opinion of Rakhmetov et al (2025) and Benardo (2024). According to Rakhmetov et al (2025), students refining digital campaigns, consumer data analyses, or copywriting receive immediate critique, helping them bridge theoretical marketing concepts with real-world execution. Similarly, Benardo (2024) added that autonomous artificial intelligent feedback guides students to plan, monitor, and reflect on their own progress, fostering independent problem-solving skills

The analysis of the degree to which artificial intelligent powered data driven instruction promotes marketing education, revealed that to a very high extent, artificial intelligent powered data driven instruction promotes marketing education in tertiary institutions in Imo State. this finding coincides with the finding of Taskin (2025). According to Taskin (2025), artificial intelligence powered, data-driven instruction significantly transforms marketing education by personalizing the student learning experience, bridging the gap between theory and modern industry practice, and enhancing overall academic engagement. The author further said that data-driven tools provide instant evaluations on student projects, essays, and simulated campaigns, allowing learners to quickly identify and correct gaps in their strategic understanding.

Conclusion

The rapid evolution of marketing field demands adaptable educational tools that can prepare students with the critical thinking and problem-solving skills needed for success in dynamic and data-rich environments. This brought about the investigation of the utilization of artificial intelligent powered adaptive learning systems in promoting of marketing education. The study specifically focused on the extent to which artificial intelligent powered learner modelling, content customization, learning feedback mechanism, and data-driven instruction promote marketing education. A descriptive analysis of the data collected revealed that learner modelling, content customization, learning feedback mechanism, and data-driven instruction powered by artificial intelligence, to a very large extent promote marketing education. Thus, the use of artificial intelligent powered adaptive learning systems is needed in marketing education to provide personalized learning experiences that improve engagement, performance, and outcomes by tailoring content and pace to individual student needs, while also giving educators valuable data-driven insights for better teaching and administrative efficiency.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Government and institutions should develop clear policies that encourage innovation, provide funding incentives, and ensure quality assurance for artificial intelligent integration in higher education and beyond.
2. Government and institutions should invest in reliable electricity, internet connectivity, and access to devices, to bridge the digital gap.
3. Government and institutions should Implement comprehensive training initiatives to equip teachers with the necessary skills to effectively use and integrate AI tools in their classrooms.
4. Government and institutions should engage communities to raise awareness about the practical benefits of artificial intelligent in improving learning outcomes, overcoming cultural resistance.

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