

Application of Artificial Intelligence in Business Education Programme for Enhanced Learning Capabilities of Postgraduate Students in Rivers State Universities

Godpower, Yiraodi Joel

Department of Business Education
Faculty of Education, Rivers State University,
Nkpolu-Oroworukwo Port Harcourt.
yiraodi.godpower@ust.edu.ng
+2348062760556

Dr. Chibuike Egbunefu

Department of Business Education
Faculty of Education, Rivers State University,
Nkpolu-Oroworukwo Port Harcourt.
Chibuikeegbunefu@gmail.com

Onyeso Tomorrow Onyemaechi

Department of Business Education
Faculty of Education, Rivers State University,
Nkpolu-Oroworukwo Port Harcourt.
tomorrow.onyeso@ust.edu.ng
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Abstract

This study focused on the Application of Artificial Intelligence in Business Education Programme for Enhanced Learning Capabilities of Postgraduate Students in Rivers State Universities. The study was guided by three specific objectives, research questions, and hypotheses. A descriptive survey design was adopted. The population consisted of 111 Business Education postgraduate students from two state universities offering Business Education programmes. Since the population was small, no sampling was done. The data collection instrument was a questionnaire developed by the researchers and validated by three Business Education experts from Rivers State University. The test-retest method using Pearson Product Moment Correlation Coefficient (PPMCC) determined the instrument's reliability, yielding a coefficient of 0.69 meaning the instrument is reliable for the study. Out of 111 instrument distributed, 108 were retrieved and used for data analysis. Mean and Standard Deviation were used to answer the research questions, while t-test statistical tool with the aid of SPSS was used to test the hypotheses at a 0.05 significance level. The findings showed that postgraduate students in Rivers State universities agreed to a high extent that Postgraduate Business Education Students apply natural language processing (NLP), data analysis and predictive analytics and automation for enhanced learning capabilities of postgraduate students. Based on the findings, it was recommended that: Natural Language

Processing (NLP) skills should be introduced to Business Education students through advanced courses or workshops focused on NLP fundamentals, including text analysis, sentiment analysis, and language generation techniques. Students should be engaged in specialized training sessions, conferences, webinars, and professional networks that focus on data analysis and predictive analytics and Institutions and non-government organizations should facilitate interdisciplinary collaboration with technology and automation experts to foster a holistic approach to integrating automation features for enhanced learning.

Keywords: *Application of Artificial Intelligence, Business Education Programme, Enhanced Learning Capabilities, natural language processing (NLP), automation features, data analysis and predictive analytics*

Introduction

The rapidly evolving landscape of technology and industry demands that educational institutions continually adapt to provide students with relevant skills and knowledge. In business education programs, artificial intelligence (AI) skills are essential for preparing students to enter and succeed in the dynamic business world. However, these programs face significant challenges that hinder the effectiveness of teaching and learning processes, ultimately impacting students' preparedness for the competitive job market. Artificial Intelligence (AI) is a branch of computer science focused on creating systems capable of performing tasks that would typically require human intelligence (Igbokwe, 2024), also Bupo and Akpomi (2023) defined Artificial intelligence as the replication of human intelligence patterns by computer systems, codes, or machines to act and reason like humans. This implies that computers or machines are made to think like humans and act rationally to solve problems. Also Suo in Okiridu, Ogwunte and Godpower (2024) noted that China's robotics industry, powered by Artificial Intelligence, has advanced significantly, replacing humans in repetitive and more dangerous tasks. AI replicates human intelligence patterns in computer systems, codes, or machines to act and reason like humans. In the same vein Godpower and Egbunefu (2024) Artificial intelligence is the application of scientific methods and procedures in creating intelligent machines, robots through intelligent computer programs that can replicate human and simplify daily tasks. These tasks include problem-solving, understanding natural language, recognizing patterns, learning from experience, and making decisions. According to Godpower and Egbunefu (2024) Artificial Intelligence systems leverage various technologies and techniques to achieve these capabilities, such as:

Machine Learning (ML): A subset of AI that involves training algorithms on data to enable them to make predictions or decisions without being explicitly programmed. ML includes techniques like supervised learning, unsupervised learning, and reinforcement learning.

Deep Learning: A subfield of machine learning that uses neural networks with many layers (hence "deep") to model complex patterns in data. Deep learning has been particularly successful in image and speech recognition.

Natural Language Processing (NLP): The ability of AI to understand and generate human language. NLP is used in applications like chatbots, language translation, and sentiment analysis.

Robotics: The design and creation of robots that can perform tasks autonomously or semi-autonomously, often using AI for navigation, object manipulation, and interaction with humans.

Expert Systems: AI programs that simulate the decision-making abilities of a human expert. These systems use a set of rules and knowledge base to provide advice or make decisions in specific domains, such as medical diagnosis or financial planning.

AI applications span numerous fields, including education, healthcare, finance, transportation, and entertainment. Examples of AI in everyday life include virtual assistants like Siri and Alexa, recommendation systems used by Netflix and Amazon, and autonomous vehicles. There is no doubt that AI has become a blessing to humanity and can be employed and applied in many areas of life, including educational management.

Several scholars and researchers have shown ways the applications of AI are evident in the field of educational management. Educational management employs the assistance of AI intelligent tutoring systems, as observed in some institutions. Intelligent tutoring systems are computer programs that use AI to provide personalized instruction to students. According to Zhang and Li (2021), these systems can "adapt to the individual learning style of each student." AI can be used to grade assignments and exams, saving educators time and providing more consistent grading. This aligns with the findings of Ecker, Langer, König, and Schmitz (2018), who stated that "automated grading systems have been shown to be as accurate as human graders in many cases." AI can also be used to analyze student data to identify at-risk students and provide targeted interventions. According to Wang, Zhang, Li, and Wang (2020), "predictive analytics can help educators identify students who are at risk of dropping out or failing a course, allowing for early intervention." Furthermore, AI makes personalized learning possible, which has numerous positive impacts, including improved learning outcomes and increased student engagement (Chen, Li, Li, & Li, 2021). In other words, AI can create personalized learning paths for students based on their individual needs and preferences (Akpomi, Nwile & Kayii, 2022).

AI-powered chatbots can provide students with immediate answers to their questions and support them outside of class hours. These chatbots can offer timely and effective support to students, thereby increasing retention and student satisfaction (Liu, Zhao, Li & Zhang, 2020). Singh and

Smith (2022) outlines several applications of AI in educational management as follows:

1. **Personalized learning:** AI can create customized learning paths for individual students based on their strengths, weaknesses, learning styles, and interests.
2. **Intelligent tutoring systems:** AI-powered tutoring systems can provide real-time feedback to students, adapt to their individual learning needs, and track their progress.

3. **Student performance prediction:** AI algorithms can analyze data on student performance, attendance, and other factors to predict which students may be at risk of falling behind and intervene early.
4. **Automated grading:** AI can grade multiple-choice and short-answer questions, freeing up teacher time for other tasks.
5. **Learning analytics:** AI can help educators analyze student data to identify trends and patterns, evaluate the effectiveness of teaching methods, and make data-driven decisions.
6. **Chatbots and virtual assistants:** AI-powered chatbots and virtual assistants can provide students with instant answers to common questions, freeing up teachers and administrators to focus on more complex tasks.
7. **Campus safety:** AI-powered surveillance systems can detect unusual behavior and potential threats, alerting campus security personnel in real-time.
8. **Recruitment and admissions:** AI can analyze applicant data to identify candidates who are most likely to succeed in a given program.
9. **Financial aid and student services:** AI can help institutions automate financial aid applications, identify students who may be eligible for scholarships or other forms of aid, and provide personalized support to students.
10. **Curriculum development:** AI can analyze trends in the job market and identify the skills and knowledge that students will need in the future, informing the development of new curricula and programs.

The application of Artificial Intelligence in business education programmes for students has the potential to revolutionize the field by enhancing learning capabilities; by leveraging AI technologies, educational institutions can create a more engaging, efficient, and effective learning environment that prepares students for future challenges and opportunities in the business world.

Importance of AI in Business Education

AI has the potential to transform various aspects of education, including business education. Here are some of the ways in which AI can be important in business education:

1. **Personalized Learning:** AI can help in creating personalized learning experiences for students by analyzing their learning styles and abilities. This allows educators to customize their teaching methods, curricula, and materials to meet the individual needs of each student. AI-based learning systems can analyze student data, such as their learning style, pace, and preferences, and provide tailored learning experiences. This can lead to improved engagement, motivation, and ultimately, better learning outcomes (Oztok & Zingaro, 2019).
2. **Intelligent Tutoring:** The use of AI in educational management can improve intelligent tutoring systems (ITS) by providing personalized and adaptive feedback to students

(VanLehn, 2011). AI-powered ITS can collect and analyze data on student performance, learning patterns, and engagement levels to provide individualized support and interventions (O'Neil & Chuang, 2019). Additionally, AI can enable ITS to adjust the difficulty of the content based on the student's proficiency level, promoting mastery learning and increasing motivation (Woolf, 2010). AI-powered intelligent tutoring systems can provide immediate feedback to students, identify knowledge gaps, and suggest suitable learning strategies, which is particularly beneficial for students needing extra support in their learning.

3. **Streamlining Administrative Tasks:** AI can improve the efficiency of administrative tasks in educational institutions. AI-powered systems can automate routine tasks such as grading, scheduling, and record-keeping, freeing up educators' time to focus on more impactful work like lesson planning and student engagement (Oztok & Zingaro, 2019). Educational institutions deal with numerous administrative tasks, and AI can automate many of these, allowing educators to focus on teaching and supporting students.
4. **Enhancing Learning Outcomes:** Recent research suggests that the application of AI in educational management can help improve learning outcomes for students (Gupta, 2020). AI-powered tutoring systems can provide personalized feedback and adaptive learning experiences tailored to each student's needs and learning style (O'Neil & Chuang, 2019). AI can analyze large amounts of student data, such as assessment scores and behavioral patterns, to identify areas where students may be struggling and provide targeted interventions (Zawacki-Richter & Anderson, 2014). AI can help educators identify which teaching methods and materials are most effective, refining and improving the curriculum for better student performance.

Limitations and Challenges of Applying AI in Business Education

AI has the potential to revolutionize business education by improving the efficiency and effectiveness of various processes, such as student learning, curriculum design, and administrative tasks. However, there are limitations to the application of AI in educational management that need to be considered:

1. **Bias and Discrimination:** One significant limitation of AI in educational management is the potential for bias and discrimination. AI algorithms may replicate and amplify existing biases in educational systems, leading to further inequality and injustice (Mason & Rennie, 2018). For example, AI may perpetuate gender or racial biases in student evaluations or admissions decisions. Business educators need to be aware of these limitations and work to ensure AI is used fairly and equitably.
2. **Lack of Transparency and Interpretability:** Another limitation of AI in educational management is the lack of transparency and interpretability. AI algorithms can be complex and difficult to understand, making it challenging for educators to evaluate their effectiveness and identify potential errors or biases (Veletsianos, 2019). This lack of

transparency can make it difficult for educational managers to make informed decisions and improve their institutions' performance.

3. **Data Privacy and Security Breaches:** The use of AI in business education requires access to large amounts of data, including personal information about students, faculty, and staff. This data is vulnerable to cyberattacks and other security breaches, potentially exposing sensitive information and undermining the trust and confidence of stakeholders (Akkaya-Kalayci & Yildirim, 2020).
4. **Dehumanization and Loss of Personal Touch:** The use of AI in educational management may lead to a reduction in human interaction and personalization, resulting in a less satisfying and engaging educational experience for students (Peters & Besley, 2020).

Future of AI in Business Education

AI is rapidly transforming business education by improving the efficiency and effectiveness of various processes, such as personalized learning, student assessment, and administrative tasks. The future of AI in educational management is bright and promising:

1. **Personalized Learning:** AI can help educators tailor learning experiences to the individual needs and preferences of each student based on their learning history and performance data. AI-based personalized learning can improve student engagement, motivation, and learning outcomes, leading to more effective educational systems (Singh, Nahar, & Kumar, 2021).
2. **Student Assessment:** AI-based assessment tools can analyze large amounts of data to provide more accurate and timely feedback to students, helping them identify areas for improvement and track their progress over time. AI-based assessment tools can reduce bias and subjectivity in grading, leading to fairer and more consistent evaluation of student performance (Hill, Song, & West, 2020).
3. **Administrative Tasks:** AI can automate routine administrative tasks such as scheduling, grading, and record-keeping, freeing up educators and administrators to focus on more strategic and creative tasks. AI-based administrative tools can improve efficiency and reduce errors, leading to more effective and streamlined educational systems (Teixeira, Ribeiro, & Costa, 2021). However, the future of AI in educational management also poses significant challenges and ethical considerations, such as the potential for bias, privacy breaches, and loss of human touch. Educators and policymakers need to develop a comprehensive framework for ethical and responsible use of AI in educational management, considering the potential benefits and risks of AI-based systems (Baroody & Wilkins-Yel, 2021).
4. **Predictive Analytics:** The use of AI in educational management has enabled the application of predictive analytics to identify students at risk of academic failure and implement targeted interventions (Kovanović, Joksimović, Poquet, Hennis, & de Graaff, 2019). AI can analyze large amounts of data on student performance, such as test scores and attendance records, to predict which students may be struggling or at risk of dropping

out (Baker & Siemens, 2014). This information can be used to provide early interventions and support to these students, improving their chances of success (Rui, Chen, & Cui, 2020).

5. **Development of Curriculum and Instructional Materials:** AI can assist educators in developing curriculum and instructional materials. By analyzing data related to student performance and feedback, AI can help identify areas where curriculum and instructional materials may need revision or improvement. This can lead to more effective teaching and learning experiences for students (Mandernach, Gonzales, & Garrett, 2020).
6. **Analyzation and Interpretation of Data:** One of the most significant benefits of AI in educational management is its ability to analyze and interpret data. With AI tools, educational institutions can gather and analyze data related to student performance, attendance, and behavior. This information can then be used to develop personalized learning plans for individual students, identify areas where teachers may need additional support, and improve overall student outcomes (Mandernach, Gonzales, & Garrett, 2020).
7. **Accurate and Timely Assessment and Feedback:** AI-powered assessment can provide real-time feedback to students, allowing them to identify areas where they need to improve and adjust their learning strategies accordingly (McKenna, 2021). AI can assist educators in automating the grading process, reducing the time and effort required for manual grading, and enabling more objective and consistent assessment (Kulkarni, Shabadi, & Hulipalled, 2019). AI can help identify patterns in student performance data, allowing educators to adjust their teaching strategies and resources to better meet the needs of individual students or groups of students (Blikstein, 2019).

Overall, AI has the potential to significantly improve educational management by providing personalized learning, intelligent tutoring, streamlining administrative tasks, enhancing learning outcomes, predictive analytics, data analysis and interpretation, and development of curriculum and instructional materials. However, it is important to use AI features like Natural Language Processing, data analysis, predictive analytics, and automation responsibly, ensuring that AI complements and enhances the learning capacity of business education students rather than replacing the human element of education (Igbokwe, 2024)

Natural Language Processing (NLP) can significantly enhance the learning capabilities of postgraduate students by providing advanced tools and resources for research, study, and academic collaboration. Here are several ways NLP can be utilized:

1. Intelligent Tutoring Systems

Personalized Learning: NLP can analyze students' progress and tailor content to their specific needs, ensuring a personalized learning experience.

Interactive Feedback: Systems can provide instant, detailed feedback on students' written assignments or responses.

2. Enhanced Research Tools

Literature Review: NLP can help in summarizing and extracting key information from large volumes of academic papers, aiding in efficient literature review.

Automated Citation: NLP tools can automate the process of finding and formatting citations, saving time and reducing errors.

3. Improved Writing Assistance

Grammar and Style Checkers: Advanced tools can not only correct grammar and spelling but also suggest improvements in style and clarity.

Plagiarism Detection: NLP can compare students' work with vast databases to ensure originality and proper citation.

4. Semantic Search Engines

Contextual Understanding: NLP-powered search engines can understand the context of queries, providing more relevant and precise search results.

Knowledge Discovery: These tools can identify patterns and connections between different pieces of research, uncovering new insights.

5. Collaborative Learning Platforms

Discussion Forums: NLP can moderate and summarize online discussions, highlight key points, and identify areas of consensus or disagreement.

Language Translation: Real-time translation tools can help non-native speakers participate fully in discussions and access a broader range of resources.

6. Content Creation and Summarization

Automated Summarization: NLP tools can condense long articles or papers into shorter summaries, making it easier to grasp key points quickly.

Question Generation: These tools can generate questions based on the content, which can be used for self-assessment or group discussions. By leveraging these NLP applications, educational institutions can create a more engaging, efficient, and supportive learning environment for postgraduate students

Automation can significantly enhance the learning capabilities of postgraduate students by streamlining administrative tasks, providing personalized learning experiences, and facilitating advanced research and collaboration. Here are some automation features that can be implemented:

1. Automated Administrative Tasks

Enrollment and Registration: Automated systems can handle course registration, enrollment processes, and scheduling, reducing administrative burdens on students.

Grade Tracking: Automated gradebooks can update in real-time, allowing students to monitor their progress and identify areas for improvement.

Notifications and Reminders: Systems can automatically send reminders for assignment deadlines, exam dates, and other important events.

2. Personalized Learning Pathways

Adaptive Learning Platforms: These platforms can adjust the difficulty and pace of content based on individual student performance and learning styles.

Recommendation Engines: Automated systems can recommend relevant articles, books, research papers, and other resources based on a student's academic interests and past activities.

3. Advanced Research Tools

Literature Management: Automation tools can organize and manage research papers, automatically categorizing them and generating summaries.

Data Analysis: Automated data analysis tools can process large datasets, performing statistical analyses, visualizing results, and identifying trends.

4. Collaborative Tools

Shared Workspaces: Automated systems can facilitate collaboration by providing shared digital workspaces where students can work on group projects, share documents, and communicate in real-time.

Version Control: Automated version control can track changes in collaborative documents, ensuring that the latest version is always available and that previous versions can be accessed if needed.

5. Content Delivery and Assessment

Automated Quizzes and Exams: These tools can create, distribute, and grade quizzes and exams, providing instant feedback to students.

Interactive Content: Automated systems can deliver interactive content such as simulations, virtual labs, and multimedia presentations that enhance learning experiences.

6. Writing and Research Assistance

Grammar and Style Checkers: Automated tools can help improve the quality of students' writing by providing real-time grammar, spelling, and style suggestions.

Plagiarism Detection: Automated systems can check for plagiarism, ensuring the originality of students' work and proper citation of sources.

7. Intelligent Tutoring Systems

Virtual Tutors: AI-powered virtual tutors can provide personalized assistance, answering questions, and guiding students through complex topics.

24/7 Support: Automated systems can offer round-the-clock support, providing answers to frequently asked questions and assisting with common issues.

8. Feedback and Evaluation

Automated Surveys and Polls: These tools can collect feedback from students about courses and instructors, helping to identify areas for improvement.

Performance Analytics: Automated systems can analyze student performance data to provide insights into learning patterns and identify students who may need additional support.

9. Knowledge Management Systems

Content Curation: Automated systems can curate relevant academic content from various sources, keeping students updated with the latest research and developments in their field.

Semantic Search Engines: These tools can enhance search capabilities by understanding the context and semantics of queries, providing more relevant and accurate results.

10. Language and Communication Tools

Real-Time Translation: Automated translation tools can help non-native speakers understand course materials and participate in discussions.

Speech-to-Text and Text-to-Speech: These tools can convert speech to text and vice versa, aiding in accessibility and enabling hands-free learning experiences. By incorporating these automation features, educational institutions can create a more efficient, personalized, and engaging learning environment for postgraduate students. These tools not only enhance the learning experience but also help students manage their time and resources more effectively, allowing them to focus on their academic goals.

Data analysis and predictive analytics can greatly enhance the learning capabilities of postgraduate students by providing insights into learning behaviors, predicting academic performance, and personalizing learning experiences. Here are several ways these technologies can be utilized:

1. Academic Performance Prediction

Early Warning Systems: Predictive analytics can identify students at risk of poor performance or dropping out by analyzing patterns in attendance, grades, and engagement. Early interventions can then be implemented to support these students.

Grade Prediction: By analyzing historical data, predictive models can forecast students' grades, allowing them to take proactive steps to improve their performance.

2. Personalized Learning

Learning Path Optimization: Data analysis can identify the most effective learning paths for individual students based on their past performance, learning styles, and preferences. This ensures that each student receives a tailored learning experience.

Content Recommendations: Predictive analytics can suggest relevant articles, videos, and other learning materials that align with a student's current coursework and interests.

3. Engagement and Retention

Student Engagement Analysis: By tracking metrics such as participation in online discussions, log-in frequency, and time spent on different learning activities, data analysis can gauge student engagement levels. Predictive analytics can then suggest interventions to boost engagement.

Retention Strategies: Analyzing factors that contribute to student retention can help institutions develop strategies to keep students enrolled and motivated.

4. Course and Curriculum Improvement

Curriculum Effectiveness: Data analysis can assess the effectiveness of different courses and curriculums by examining student outcomes and feedback. Predictive analytics can suggest modifications to improve learning outcomes.

Resource Allocation: Analyzing usage patterns of educational resources (e.g., library materials, online platforms) can help institutions allocate resources more effectively.

5. Skill Gap Analysis

Identifying Gaps: Data analysis can identify skills and knowledge gaps by comparing students' performance with industry standards or academic benchmarks. Predictive models can then suggest additional courses or resources to fill these gaps.

Career Path Planning: Predictive analytics can align students' skills and academic achievements with potential career paths, providing guidance on the necessary steps to achieve their career goals.

6. Research and Collaboration

Research Trend Analysis: Data analysis can identify emerging trends and key areas of interest in academic research, helping students focus their research efforts on cutting-edge topics.

Collaborative Opportunities: Predictive models can identify potential collaborators within and outside the institution based on research interests and past publications.

7. Feedback and Assessment

Automated Assessment: Predictive analytics can streamline the grading process by predicting likely outcomes based on past performance and automating parts of the assessment process.

Continuous Feedback: Data-driven insights can provide continuous feedback to students, helping them understand their strengths and weaknesses in real-time.

8. Learning Analytics Dashboards

Visualizing Progress: Dashboards can provide students and educators with visual representations of academic progress, engagement levels, and predicted outcomes. This helps in making informed decisions about learning strategies.

Comparative Analysis: Students can compare their performance with peers, understanding where they stand and what areas need improvement.

By leveraging data analysis and predictive analytics, educational institutions can create a more responsive, personalized, and effective learning environment for postgraduate students. These tools not only enhance the learning experience but also empower students to take control of their academic journey and achieve their full potential. AI has the potential to revolutionize postgraduate education by providing personalized learning experiences, enhancing research capabilities, and improving overall student engagement and success. By leveraging AI, educational institutions can create a more effective and inclusive learning environment for postgraduate students.

Enhancing the learning capabilities of students involves implementing strategies and technologies that support advanced education, research, and professional development. By incorporating these strategies, postgraduate education can be significantly enhanced, leading to better learning outcomes, higher student satisfaction, and more innovative research. Institutions must embrace technology, foster collaboration, and provide comprehensive support to help postgraduate students reach their full potential.

Challenges in Business Education on the application of Artificial Intelligence

Outdated Teaching Methods: Traditional teaching methods, which often rely heavily on lectures and rote learning, are insufficient in developing critical thinking, problem-solving skills, and practical business acumen in students. This gap between theoretical knowledge and practical application leaves graduates underprepared for real-world business challenges.

Limited Access to Resources: Many students and educators in Rivers State universities lack access to modern educational resources and tools. This limitation restricts the breadth and depth of learning materials available, impeding students' ability to explore and understand complex business concepts.

Personalized Learning Deficiencies: Current educational frameworks often fail to accommodate individual learning styles and paces. The one-size-fits-all approach neglects the diverse needs of students, resulting in suboptimal learning outcomes and engagement levels.

Insufficient Industry Integration: There is a significant disconnect between academic curricula and industry requirements. Business education programs in Rivers State universities frequently do not align with the latest industry trends and technological advancements, making it difficult for graduates to transition smoothly into the workforce.

Resource Constraints for Educators: Educators often face challenges such as large class sizes, limited professional development opportunities, and a lack of support in integrating innovative

teaching methods. These constraints hinder their ability to deliver high-quality, impactful education.

Statement of the Problem

In the current educational landscape, emerging technologies such as artificial intelligence (AI), live streaming, cloud computing, virtual reality, augmented reality, wearable technologies, and the Internet of Things are revolutionizing the quality of jobs performed by educators and students. These technologies empower individuals to update their skills, ensuring they remain competitive in the future job market by adapting to changing educational trends. For business educators, embracing these innovations is crucial for career success and aligning with the demands of the modern workplace. The integration of AI, in particular, holds significant potential for transforming Business Education programs by enhancing job performance, improving task efficiency, and elevating the overall quality of education.

Despite the recognized benefits of emerging technologies, there is a notable gap in the readiness and application of these tools among Business Educators in Rivers State universities. Studies by Edeh, Sharma, Nwafor, Fyeface, and Edeh (2020) highlight concerns regarding educators' familiarity with and utilization of emerging technologies in the 21st-century academic environment. Additionally, Ukata and Udeh (2022) point out that many business educators struggle to integrate these technologies into their teaching practices, negatively impacting students' exposure to and engagement with modern technological tools.

This disconnect poses significant challenges: educators who fail to adopt these advancements risk falling behind their peers and missing valuable professional opportunities. Moreover, without embracing AI and other technologies, lecturers may find it difficult to address the diverse learning styles and abilities of their students, ultimately compromising educational outcomes.

Given this scenario, a research-based knowledge gap exists that necessitates empirical investigation. This study aims to fill this gap by examining the extent to which business educators in Rivers State universities apply AI in their teaching practices. It will explore how AI can enhance the learning capabilities of students, ensuring they are well-prepared for the dynamic business world.

Purpose of the Study

The purpose of the study was to examine Application of Artificial Intelligence in Business Education Students programme for Enhanced learning capabilities of postgraduate students in Rivers State universities. Specifically, the study seeks to;

- 1. Determine the extent to which Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities.*
- 2. Determine the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities.*

3. Determine the extent to which Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Research Questions

The following research questions were raised to guide the study:

1. To what extent do Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities?
2. To what extent do Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities?
3. To what extent do Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities?

Hypotheses

1. There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities.
2. There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities.
3. There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Methodology

The research design adopted for this study was a descriptive research design, which established the significance difference between Business Education Postgraduate Students Application of artificial intelligence in business education programme for enhanced learning capabilities of postgraduate in Rivers State universities. The study's population consists of 111 postgraduate Business Education students from Rivers State-owned universities that offer Business Education. This includes 9 Ph.D. and 33 master's students (a total of 42) from Rivers State University for the 2023–2024 academic year, and 23 Ph.D. and 46 master's students (a total of 69) from Ignatius Ajuru University of Education, both located in Port Harcourt. Out of 111 instrument distributed, 108 was retrieved and used for data analysis. The choice of the population is based on the fact that the two universities offer Business Education in postgraduate programmes, meaning that no sampling technique was adopted since the sample size is small and manageable for the study. The researcher developed a self-structured instrument title: Business Education Postgraduate Students

Application of artificial intelligence in Business Education programme for enhanced learning capabilities (QAAIBEOELC) for the data collection of the study. The instrument was subjected to face and content validation. The research instrument was validated by three experts in business education, all in the Faculty of Education at Rivers State University, Port-Harcourt. The research instrument was reviewed and restructured by the validators for clarity, relevance, and appropriateness for the study. All the corrections and input from the experts were used to modify the research instruments. The study adopted a 4-point rating scale for Very High Extent (VHE-4 points), High Extent (HE-3 points), Moderate Extent (ME-2 points), and Low Extent (LE-1 point). In order to establish reliability of the instrument, PPMCC was used to test the reliability of the instrument. A reliability coefficient of 0.89 was obtained, indicating that the instrument was reliable for this study. The data collected, organised, and analysed will revolved around the research questions and the hypotheses formulated to guide the study. The research questions and hypotheses were answered using Mean and Standard Deviation, While the null hypotheses were tested at 0.05 level of significance with t-test statistics. The decision rule was that the null hypotheses was retained when the critical r value is less than the calculated r value; otherwise, they were settled for the alternate.

Analysis of Data, Results and Hypothesis Testing

Research Question 1: To what extent do Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities?

Table 1.1 Mean Response on the extent Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities (N=108)

S/N	ITEMS	\bar{x}	S.D	Remark
1.	I can use natural language processing tools to summarize lengthy academic papers, books, and articles	3.30	0.84	HE
2.	Implementing chatbots for answering common questions, providing study tips, and assisting me with academic tasks	3.35	0.70	HE
3	Utilizing natural language processing -based translation tools has helped me to access and understand academic resources in different languages	3.40	0.59	HE
4	I can use speech-to-text technology for transcribing lectures, seminars, and meetings	2.59	0.79	ME
5	Applying natural language processing algorithms to detect plagiarism in academic writing has helped to enhanced my learning capabilities	3.31	0.63	HE

Grand Mean & S.D

0.71 HE
3.19

Source: Field Survey (2025)

The result in table 1.1 shows that Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities some to a high extent.

Research Question 2: To what extent do Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities?

Table 1.2 Mean Response on the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities

(N=108)

S/N	ITEMS	\bar{x}	S.D	Remark
6.	Implementing automation features -driven systems has helped me to create personalized learning plans based on students' strengths, weaknesses, and preferences	3.56	0.76	HE
7.	Automation features has allowed me to focus more on learning and less on administrative tasks	3.13	0.78	ME
8	Utilizing automation features tutors has provide me personalized assistance, answer questions, and offer explanations on complex topics	3.30	0.72	ME
9	Automation features can also provide instant feedback, helping students understand their mistakes and improve	3.43	0.78	ME
10	Leveraging Automation features to conduct preliminary research, gather relevant data, and identify key sources to me	2.89	0.60	ME
11	Using Automation features to predict academic performance and identify areas where a student might need additional support to me	3.57	0.80	HE
12	Automation features aids in the writing process and ensures consistency in style and quality	3.17	0.57	HE
Grand Mean & S.D		3.28	0.71	HE

Source: Field Survey (2025)

Data contained in table 1.2 shows that Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities, moderate extent, while item two and seven to a high extent. with all the items above 2.50, the grand mean scores of 3.28 and Standard Deviation 0.71 respectively.

Research Question 3: To what extent do Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities?

Table 1.3 Mean Response on the extent Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities (N=108)

S/N	ITEMS	\bar{x}	S.D	Remark
13	Data analysis and predictive analytics helps in providing timely interventions and personalized assistance	3.46	0.68	HE
14	Data analysis and predictive analytics aids in developing strategic business plans and improving decision-making skills	3.35	0.51	HE
15	Data analysis and predictive analytics aid in analyzing students' engagement and participation in online learning platforms to predict their success and identify factors that influence their learning outcomes	3.41	0.73	HE
16	Applying predictive analytics to financial data helps in forecast economic trends and business performance	3.41	0.51	HE
17	Analyzing data to optimize the allocation of resources such as study materials, faculty attention, and lab time	3.53	0.61	HE
18	Using text mining and sentiment analysis on student feedback to improve course content, teaching methods, and overall learning experience	3.22	0.63	HE
19	Applying data analysis help to map students' competencies and skills against industry requirements	3.64	0.62	HE
20	Using predictive analytics to design customized learning pathways that align with career goals and academic strengths	3.34	0.67	HE
Grand Mean & S.D		3.40	0.60	HE

Source: Field Survey (2025)

The results in table 1.3 shows Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities to a high extent on all the items, with the grand mean and standard deviation 3.40 and 0.60 which are obviously above the criterion mean of 2.50.

Hypotheses

Hypotheses 1: There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which

Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Table 1.4: Computation of difference in mean ratings between postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Respondents	N	\bar{x}	SD	t-cal.	t. crit.	Df	α	Decision
RSU	41	3.53	0.22	1.875	1.516	106	0.05	Accepted
IAUE	67	3.41	0.28					

Source: Field Survey (2025)

The data in table 1.4 showed the t-calculated value of 1.88 at 106 degree of freedom and 0.05 level of significance, with the t-critical value 1.516. The null hypothesis was upheld because t-critical is greater than the t-calculated. This implies that there is no significance difference between Business Education Postgraduate Students of Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply natural language processing (NLP) for enhanced learning capabilities of postgraduate students.

Hypotheses 2: There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Table 1.5: Computation of difference in mean ratings between postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Respondents	N	\bar{x}	SD	t-cal.	t. crit.	Df	α	Decision
RSU	41	3.34	0.37	1.525	1.516	106	0.05	Accepted
IAUE	67	3.30	0.29					

Source: Field Survey (2025)

The data in table 1.5 showed the t-calculated value of 1.525 at 106 degree of freedom and 0.05 level of significance, with the t-critical value 1.516. The null hypothesis was upheld because t-critical is greater than the t-calculated. This implies that there is no significance difference between Business Education postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Hypotheses 3: There is no significant difference in the mean ratings of postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Table 1.6: Computation of difference in mean ratings between postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Respondents	N	\bar{x}	SD	t-cal.	t. crit.	Df	α	Decision
RSU	41	3.51	0.21	4.003	1.516	106	0.05	Accepted
IAUE	67	3.48	0.23					

Source: Field Survey (2025)

The data in table 1.6 showed the t-calculated value of 4.00 at 106 degree of freedom and 0.05 level of significance, with the t-critical value 1.516. The null hypothesis was upheld because t-critical is greater than the t-calculated. This implies that there is no significance difference between postgraduate students in Rivers State University and Ignatius Ajuru University of Education on the extent to which Postgraduate Business Education Students apply data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities.

Discussion of findings

Analysis of Data, Research Question and hypothesis 1, natural language processing (NLP) for enhanced learning capabilities of postgraduate students in Rivers State Universities: The findings of the study revealed that Business Education postgraduate students in Rivers State Universities are knowledgeable and willing to use Natural Language Processing (NLP) technologies like chatbots, automated summarization tools, language translation services, etc., to enhance their learning experiences. They understand how to: utilize NLP tools for efficient information retrieval, leverage text analysis for deeper insights, use automated grading systems to evaluate assignments, employ sentiment analysis to gauge peer feedback, and utilize NLP for personalized learning recommendations.

These skills indicate that NLP technologies play a vital role in the modern educational environment, and students are in agreement about adopting these technologies. This aligns with Igbokwe (2024), who found a positive significant relationship between NLP implementation management skills for effective learning and some postgraduate business education students possessing NLP implementation management skills. Stergiou and Psannis further noted that NLP technologies are prominent and popular, with many educational institutions shifting towards them due to benefits such as enhanced learning capabilities, improved student engagement, and personalized education experiences.

Analysis of Data, Research Question and hypothesis 2, automation features for enhanced learning capabilities of postgraduate students in Rivers State Universities: The findings of the study showed that Business Education postgraduate students in Rivers State Universities possess essential skills in using various automation tools and platforms to enhance their learning

efficiency. In line with Kulkarni, Shabadi, and Hulipalled (2019) students can use automated grammar checkers like Grammarly to improve their writing, utilize AI-powered chatbots like ChatGPT for obtaining academic information, employ paraphrasing tools like Quillbot for rephrasing research content, use automated editing tools like ChatAI to refine their academic papers, apply plagiarism detection tools to ensure the originality of their work, and utilize AI summarization tools like Ask AI to condense research articles for presentations.

By acquiring automation management skills, students can effectively enhance their learning capabilities. These skills are crucial for identifying potential areas for automation and implementing strategies to optimize them, ensuring a streamlined and efficient educational environment. The integration of AI tools and proper mentoring in automation management will prepare students to handle the complexities of modern educational demands, contributing to overall academic success and effectiveness.

Analysis of Data, Research Question and hypothesis 3, data analysis and predictive analytics for enhanced learning capabilities of postgraduate students in Rivers State Universities: The findings from the analysis on research question three revealed that Business Education postgraduate students in Rivers State Universities possess key skills in data analysis and predictive analytics that are vital for enhancing their learning capabilities. Specifically, they know how to: use data analysis techniques to interpret complex data, handle large datasets to extract meaningful insights, implement predictive models to forecast academic performance, handle data visualization tools to present information effectively, regularly analyze academic progress to identify areas for improvement, implement learning analytics to personalize educational experiences and improve outcomes.

The researcher believes that when students have the opportunity to explore data-driven insights, their self-understanding, maturity, independence, and motivation to continue will increase. By gaining these skills, students can thrive in their academic pursuits. The findings also revealed that Business Education students gained valuable analytical skills during internships, helping them develop work-related competencies and acquire basic skills necessary for effective application of data analysis and predictive analytics.

These findings align with Kovanović, Joksimović, Poquet, Hennis and de Graaff (2019), who reported that the primary function of data analysis is to interpret and understand complex data sets. This has been confirmed by Akkaya-Kalayci and Yildirim (2020), which revealed that more than 50% of organizations have implemented data analytics solutions for interpretation purposes. Additional functions include the ability of organizations to predict trends through data analysis and making informed decisions based on the system's insights. AI can help analyze and predict outcomes simultaneously, thereby lowering costs and increasing efficiency.

Acquiring data analysis and predictive analytics skills is essential for enhanced learning capabilities. These skills enable students to identify and understand potential trends within their academic data, implement predictive measures, and respond effectively to learning challenges. Proper training and experience in data analysis and predictive analytics will equip students with the tools necessary to optimize their educational experiences, contributing to overall academic success and effectiveness.

Conclusion

Addressing the challenges faced by business education programme through the application of AI can significantly enhance the learning capabilities of students. By modernizing teaching methods, improving resource access, personalizing learning experiences, and aligning education with industry demands, AI has the potential to transform business education and better prepare students for successful careers in the business world. By and large, the application of artificial intelligence (AI) in business education can revolutionize the field of education. AI-powered tools can help educators personalize the learning experience, improve student engagement, and provide real-time feedback.

Moreover, AI can assist students and educational institutions in streamlining administrative tasks, automating grading and assessments, and optimizing resource allocation. The application of AI in educational management holds great promise for improving the quality and effectiveness of education, but it is important to approach this technology with caution and awareness of its potential limitations. By implementing AI-driven analytics, business education programs can gain insights into student performance and learning patterns, allowing for data-driven decision-making. AI can also facilitate adaptive learning environments, where educational content is tailored to meet the individual needs of students, thereby enhancing their learning outcomes.

Additionally, AI can simulate real-world business scenarios, providing students with practical experience and preparing them for the complexities of the business environment. This practical application of AI in business education ensures that students are equipped with the necessary skills to navigate and succeed in the ever-evolving business landscape. In conclusion, the integration of AI into business education programme for postgraduate students can lead to significant improvements in learning capabilities. By leveraging AI technologies, educational institutions can create a more engaging, efficient, and effective learning environment that prepares students for future challenges and opportunities in the business world.

Recommendations

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

1. Natural Language Processing (NLP) skills should be introduced to Business Education students through advanced courses or workshops focused on NLP fundamentals, including text analysis, sentiment analysis, and language generation techniques. These courses should incorporate practical projects that simulate real-world scenarios, such as developing chatbots, creating automated summarization tools, and analyzing large text datasets for insights. Additionally, encourage students to pursue industry certifications in NLP, such as the TensorFlow Developer Certificate or the Microsoft Certified: Azure AI Engineer Associate, to validate their skills and knowledge for enhancing learning capabilities and applying NLP effectively in educational and professional contexts.
2. Institutions and non-government organizations should facilitate interdisciplinary collaboration with technology and automation experts to foster a holistic approach to integrating automation features for enhanced learning capabilities. This collaboration can help identify and implement effective automation tools and strategies, such as automated

grading systems, personalized learning platforms, and AI-driven content delivery, ensuring that students benefit from cutting-edge educational technologies.

3. Students should be engaged in specialized training sessions, conferences, webinars, and professional networks that focus on data analysis and predictive analytics. This can include hands-on projects, simulations, or internships with industry partners, as well as workshops focused on techniques such as data mining, statistical analysis, machine learning, and predictive modeling. Additionally, encourage students to stay updated with emerging trends in data analytics and industry best practices to ensure they are equipped with the latest tools and methodologies for enhancing their learning capabilities.

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