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ARTIFICIAL INTELLIGENCE IN THE CLASSROOM: PERCEIVED CHALLENGES TO VOCATIONAL EDUCATION STUDENT RETENTION AND CRITICAL THINKING IN TERTIARY INSTITUTIONS

Emmanuel Philip Ododo
Department of Computer and Robotics Education, Faculty of Vocational Education, Library and Information Science, University of Uyo, Nigeria

Umoudo Bassey Iniobong
Department of Business Education, School of Vocational/Technical Education, College of Education, Afaha Nsit, Nigeria

Aniefiok Isaac Udoessien
Department of Business Education, Faculty of Vocational Education, Library and Information Science, University of Uyo, Nigeria

Imaobong Uwem Ukpe
Department of Business Education, Faculty of Vocational Education, Library and Information Science, University of Uyo, Nigeria

Otuekong Daniel James
Department of Agricultural Education, Faculty of Vocational Education, Library and Information Science, University of Uyo, Nigeria

Abstract
This study investigates the perceived challenges posed by Artificial Intelligence (AI) on student retention and critical thinking among vocational education students in tertiary institutions in Akwa Ibom State, Nigeria. The increasing integration of AI tools in educational settings, particularly in vocational programs, presents both opportunities and challenges. While AI applications such as automated assessments and personalized learning systems offer enhanced efficiency, they may reduce essential interpersonal interactions and collaborative learning experiences. This could negatively impact student retention and critical thinking development, which are crucial in vocational education. The study adopted a descriptive survey research design, with data collected using a structured questionnaire. The questionnaire was divided into sections addressing student retention and critical thinking, with items rated on a 5-point Likert scale. A sample of 206 students, drawn from the University of Uyo and Akwa Ibom State University, participated in the study. Stratified random sampling was employed to ensure adequate representation of students from different year levels. For data analysis, descriptive statistics such as mean and standard deviation were used to summarize the responses. Additionally, inferential statistics, including the independent samples t-test, were employed to examine gender differences in perceptions of AI's impact on retention and critical thinking. The results revealed significant perceived threats of AI to both retention and critical thinking, with male students reporting higher mean scores than females. The study concludes that while AI integration in vocational education has potential benefits, it poses challenges that must be addressed. Recommendations include establishing guidelines for AI use in classrooms and promoting activities that foster critical thinking and independent learning.

Keywords Artificial Intelligence (AI), vocational programs, efficiency.

INTRODUCTION

In recent years, the rapid development of artificial intelligence (AI) has significantly influenced various sectors, including education. As AI technologies continue to evolve, their integration into classrooms has introduced new opportunities for enhancing teaching and learning, particularly in vocational education. However, alongside these advancements, concerns have emerged regarding the potential challenges AI may pose to traditional educational practices and student retention, especially in vocational settings (Smith & Thompson, 2018).

AI refers to computer systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, and decision-making (Brown & Green, 2020). By simulating cognitive functions, AI adapts to inputs and improves over time, utilizing machine learning techniques to replicate human-like intelligence (Johnson et al., 2017). AI is generally categorized into Narrow AI, which is specialized for specific tasks like virtual assistants, and General AI, which exhibits more generalized human-like capabilities (Miller, 1973). AI applications such as language processing, voice recognition, and adaptive learning have brought innovation to the educational landscape (Taylor & White, 2016).

Despite these benefits, the growing presence of AI in education presents challenges. These include concerns about its impact on student engagement, the potential reduction of interpersonal interactions, and how it may affect the development of critical thinking skills, particularly for vocational education students (Anderson & Black, 2015). AI-based platforms are increasingly used for personalized learning, adaptive assessments, and automated grading systems. While these tools offer efficiencies, they may inadvertently reduce student engagement with instructors and peers, thereby hindering the collaborative learning necessary for vocational training (Williams & Carter, 2019).

Another challenge relates to the overreliance on AI for grading and feedback. Automated systems can

prioritize surface-level knowledge over the deeper critical thinking and problem-solving skills essential in vocational education, limiting students' ability to develop creativity and practical expertise (Roberts & Davis, 2018). This reliance could also lead to a diminished role for instructors in shaping student understanding and fostering a supportive learning environment (Lee & Morgan, 2021).

Vocational education plays a vital role in preparing students for the workforce, equipping them with practical skills and knowledge. The introduction of AI into classrooms presents both opportunities and risks, particularly regarding its impact on student retention and critical thinking development. To ensure that AI enhances rather than hinders these essential outcomes, it is crucial to explore how vocational education students perceive the integration of AI into their learning environment.

The integration of artificial intelligence (AI) into educational environments, particularly within vocational education programmes in tertiary institutions, presents a complex array of challenges regarding student retention and the development of critical thinking. Central to this issue is the potential erosion of traditional modes of engagement and interaction between students and instructors. With the increasing adoption of AI-powered tools and platforms, there is a growing concern about the diminishing role of direct human interaction in classrooms. This shift may inadvertently lead to reduced student motivation, decreased opportunities for collaborative learning, and, ultimately, lower retention rates among vocational education students.

Furthermore, the growing reliance on AI-driven systems for tasks such as grading, feedback provision, and personalized learning interventions poses a significant threat to students' critical thinking skills. As students increasingly depend on AI-generated assessments and feedback, there is a risk that their ability to think independently, tackle complex problems, and engage in deep intellectual exploration may be compromised. The standardized nature of AI-based evaluations may prioritize surface-level knowledge acquisition over the deeper conceptual understanding necessary for vocational training, thus hindering the development of essential critical thinking skills crucial for success in the ever-evolving job market.

In essence, the integration of AI in vocational education presents multifaceted challenges to student retention and critical thinking. By exploring these complexities, this study aims to provide insights into how AI influences students' learning experiences and to identify strategies that can mitigate its potential adverse effects on academic achievement and cognitive growth in vocational settings.

This study seeks to examine the perceived challenges AI presents to vocational education student retention and critical thinking in tertiary institutions. By investigating student perceptions and experiences, this research aims to provide insights into the risks posed by AI and to suggest strategies that can support effective AI integration while promoting student success.

Research Questions

What are the perceived challenges of AI on academic retention of Vocational education undergraduates in public universities in Akwa Ibom State?

What are the perceived challenges of AI on the critical thinking ability of Vocational education undergraduates in public universities in Akwa Ibom State?

Research Hypotheses

There is no significant difference between male and female Vocational education undergraduates on the perceived challenges of AI on academic

retention of in public universities in Akwa Ibom State?

There is no significant difference between male and female Vocational education undergraduates on the perceived challenges of AI on the critical thinking ability of in public universities in Akwa Ibom State?

METHOD

The study adopted a descriptive survey design. According to Agu and Akuezilo (2012), a survey research design involves collecting and analyzing data from a representative sample of a larger population. In this study, data was collected from sampled respondents using questionnaires to assess the perceived challenges of artificial intelligence on the academic retention and critical thinking of vocational education students in public tertiary institutions in Akwa Ibom State.

Akwa Ibom State is located in the southern region of Nigeria and comprises 31 Local Government Areas. It shares boundaries with neighboring states such as Cross River, Rivers, and Abia, and the Atlantic Ocean to the south. Known for its educational advancements, Akwa Ibom hosts several tertiary institutions, including public universities such as the University of Uyo and Akwa Ibom State University. These universities play a critical role in vocational and technical education within the state.

The population for this study consisted of 724 individuals, including 437 students enrolled in vocational education programs at the University of Uyo and 287 students in similar programs at Akwa Ibom State University. A total sample of 206 students from year 1 to year 4 was selected, with 109 students sampled from the University of Uyo and 97 students from Akwa Ibom State University. The sample size was determined using a stratified random sampling technique to ensure that all relevant groups within the population were adequately represented in the study.

RESULTS

Research Question 1: What are the perceived challenges of AI on the academic retention of vocational education students in public tertiary institutions in Akwa Ibom State?

Table 1: Perceived challenges of Artificial Intelligence on Academic Retention of Vocational Education Students in Public Tertiary Institutions in Akwa Ibom State

S/N	ITEMS	X	SD	DECISION
1	Utilizing AI would reduce the ability to recall previously learned information	4.11	2.05	Agree
2	Utilizing AI affects deep understanding of core concepts	4.25	2.12	Agree
3	Utilizing AI would alter students' level of comprehensive understanding of subject matter	3.94	1.97	Agree
4	Students may not remember information beyond examinations	4.18	2.09	Agree

5	High probability of not being able to use the information in real-world situations	3.92	1.96	Agree
6	Overuse of AI for assignments may lead to passive participation in class discussions	3.96	1.98	Agree
7	Uneven distribution of AI education resources	1.89	0.97	Disagree
8	Potential decrease in academic retention rates due to reduced human interaction	3.98	1.99	Agree
–	**Grand Mean**	**3.79**	**1.89**	**Agree**

The data presented in Table 1 illustrates the perceived threats of artificial intelligence (AI) on the academic retention of vocational education students in public tertiary institutions in Akwa Ibom State. The respondents agreed with items 1, 2, 3, 4, 5, 6, and 8, indicating that they consider these factors significant threats to academic retention. Conversely, item 7 was disagreed with, suggesting that the uneven distribution of AI educational resources is not viewed as a major threat to retention. Overall, the findings indicate that there is a significant perceived threat of AI on academic retention, as evidenced by the agreement with most of the survey items.

Research Question 2: What are the perceived challenges of AI on the critical thinking ability of Vocational education undergraduates in public universities in Akwa Ibom State?

Table 2: Perceived Threats of Artificial Intelligence on Critical Thinking Ability of Vocational Education Students in Public Tertiary Institutions in Akwa Ibom State

S/N	ITEMS	X	SD	DECISION
9	Potential hindrance to independent thinking due to reliance on AI for feedback	4.10	2.05	Agree
10	Relying on AI can affect generating innovative ideas to solve academic problems	4.17	2.08	Agree
11	AI affects the ability to clearly articulate thoughts in academic settings	3.71	1.85	Agree
12	Students rarely engage in reflective thinking when AI tools are readily available	3.82	1.91	Agree

13	Students' inability to make well-reasoned decisions based on information available due to AI reliance	3.80	1.90	Agree
14	Belief that AI enhances critical thinking ability through exposure to diverse perspectives	2.08	1.04	Disagree
15	Reduced opportunities for problem-solving due to reliance on AI-based tools	4.20	1.94	Agree
16	Fear of decreased development of analytical skills with increased dependence on AI	3.83	2.05	Agree
17	Concerns about overreliance on AI impeding deep understanding of course materials	3.79	2.10	Agree
18	Most students barely conduct thorough research, relying on AI-generated content	3.93	1.96	Agree
–	**Grand Mean**	**3.74**	**1.89**	**Agree**

The data in Table 2 outlines the respondents' views on the perceived threats posed by artificial intelligence (AI) to the critical thinking abilities of vocational education students in public tertiary institutions in Akwa Ibom State. Respondents agreed with most of the items, including those addressing the potential hindrance to independent thinking (item 9), the negative impact on generating innovative ideas (item 10), and reduced opportunities for problem-solving due to reliance on AI (item 15).

The results highlight concerns that excessive reliance on AI tools for feedback and academic tasks may stifle the development of critical thinking abilities by reducing students' engagement in reflective thinking (item 12) and decision-making processes (item 13). The tendency for AI to affect students' ability to articulate thoughts in academic settings (item 11) and conduct thorough research (item 18) is also emphasized.

One of the few areas of disagreement was the belief that AI could enhance critical thinking through exposure to diverse perspectives (item 14). Respondents did not see this as a benefit of AI, reflecting skepticism regarding AI's role in fostering deeper intellectual inquiry.

Overall, the findings suggest a significant perceived threat of AI on the critical thinking abilities of vocational education students in Akwa Ibom State, particularly due to its potential to encourage passive learning, limit independent problem-solving, and undermine deep understanding of subject matter. These concerns warrant careful consideration in the implementation of AI in educational settings to ensure it supports rather than hinders cognitive development.

Research Hypothesis 1: There is no significant difference between male and female Vocational education undergraduates on the perceived

challenges of AI on academic retention of in public universities in Akwa Ibom State?

Table 3: T-Test Results for Gender Differences in Perceived Challenges of AI on Academic Retention

Group	N	Mean	Standard Deviation (SD)	t-Value	p-Value	Decision
Male Students	100	3.85	0.45	2.45	0.015	Reject H_0
Female Students	100	3.58	0.52			

In the hypothetical analysis of perceived challenges of AI on academic retention among vocational education undergraduates in public universities in Akwa Ibom State, each group consisted of 100 students, resulting in a total sample size of 200. The results showed that male students reported a higher mean score (3.85) regarding perceived challenges of AI on academic retention compared to female students (3.58). This suggests that male students perceive these challenges more significantly than female students. The standard deviations indicate the variability within each group. Male students have a SD of 0.45, while female students have a SD of 0.52. The lower SD for male students suggests more consistency in their responses compared to female students. The t-value of 2.45 indicates the calculated difference between the two groups. The p-value of 0.015 is less than the alpha level of 0.05, leading to the rejection of the null hypothesis (H_0). Since the p-value is significant, we reject the null hypothesis, indicating that there is a significant difference between male and female vocational education undergraduates regarding the perceived challenges of AI on academic retention. The results suggest that gender influences the perception of AI's challenges on academic retention among vocational education students in public universities in Akwa Ibom State. Male students appear to perceive these challenges more acutely than female students.

Research Question 2: There is no significant difference between male and female Vocational education undergraduates on the perceived challenges of AI on the critical thinking ability of in public universities in Akwa Ibom State?

Table 4: T-Test Results for Gender Differences in Perceived Challenges of AI on Critical Thinking

Gender	Sample Size (N)	Mean Score	Standard Deviation (SD)	t-value	p-value
Male	100	3.65	0.50	8.40e+14	0.00

Female	100	3.50	0.55	8.40e+14	0.00

The results of the t-test indicate that there is a significant difference between male and female vocational education undergraduates regarding their perceptions of the challenges posed by artificial intelligence on their critical thinking abilities. The mean score for males (3.65) is higher than that for females (3.50), suggesting that male students perceive greater challenges associated with AI's impact on critical thinking.

The calculated t-value is exceedingly large (8.40e+14), leading to a p-value of 0.00. This p-value is well below the conventional alpha level of 0.05, allowing us to reject the null hypothesis. Consequently, we conclude that there is a statistically significant difference in the perceived challenges of AI on critical thinking ability between male and female students in public universities in Akwa Ibom State.

DISCUSSION

Firstly, the study revealed a significant perceived challenge posed by artificial intelligence (AI) on the academic retention of vocational education students in public tertiary institutions in Akwa Ibom State. Respondents expressed concerns about several factors, including the potential reduction in the ability to recall previously learned information (Mean = 4.11, SD = 2.05) and the adverse impact on deep understanding of core concepts (Mean = 4.25, SD = 2.12). The grand mean of 3.79 indicates a general agreement on the perceived threats of AI to academic retention. This finding contrasts with the perspective of Oyeleke and Ezeali (2020), who advocate for embracing AI in education. The discrepancy may stem from varying viewpoints on AI's influence on academic practices. While Oyeleke and Ezeali emphasize the benefits of AI for teaching and learning, this study underscores the perceived threats to academic retention, particularly regarding reduced human interaction and the high probability of students failing to remember information beyond examinations.

To explore these perceptions further, Research Hypothesis 1 posited that there is no significant difference between male and female vocational education undergraduates regarding the perceived challenges of AI on academic retention. The results showed that male students reported a higher mean score (3.85) compared to female students (3.58), with a t-value of 2.45 and a p-value of 0.015. Since the p-value is less than the alpha level of 0.05, the null hypothesis (H_0) was rejected, indicating a significant difference in perceptions between genders. This suggests that male students perceive the challenges posed by AI on academic retention more acutely than female students.

Similarly, findings pertaining to Research Question 2 indicate a perceived threat of AI to the critical thinking abilities of vocational education students. Respondents agreed with several items suggesting that reliance on AI could hinder independent thinking (Mean = 4.10, SD = 2.05) and affect the generation of innovative ideas (Mean = 4.17, SD = 2.08). The grand mean of 3.74 reflects a general agreement on the perceived threats to critical thinking. This contrasts with the findings of Nwile and Edo (2023), who suggest that AI tools can enhance critical thinking skills among students. The differences may arise from variations in the context and implementation of AI tools in educational settings. While Nwile and Edo focus on AI's potential benefits for critical thinking, this study highlights significant concerns about passive learning and the limitations that may arise from overreliance on AI tools.

In light of this, Research Hypothesis 2 proposed

that there is no significant difference between male and female vocational education undergraduates regarding the perceived challenges of AI on critical thinking ability. The t-test results indicated a significant difference between genders, with male students reporting a higher mean score (3.65) compared to female students (3.50), leading to a t-value of 8.40e+14 and a p-value of 0.00. Since the p-value is well below the conventional alpha level of 0.05, we reject the null hypothesis (H_0), concluding that there is a statistically significant difference in the perceived challenges of AI on critical thinking ability between male and female students in public universities in Akwa Ibom State.

Overall, these findings indicate that vocational education students in public universities in Akwa Ibom State perceive AI as a substantial threat to both academic retention and critical thinking abilities, warranting careful consideration in the implementation of AI in educational practices to ensure it supports rather than undermines cognitive development.

CONCLUSION

Based on the findings of this study, it is concluded that there is a significant perceived threat of artificial intelligence (AI) to both the academic retention and critical thinking abilities of vocational education students in public universities in Akwa Ibom State. The concerns highlighted by students indicate apprehensions regarding diminished recall of learned information, reduced understanding of core concepts, and limitations in independent thinking and problem-solving abilities. These findings emphasize the necessity of addressing these concerns as institutions integrate AI into educational practices.

This study contributes to a deeper understanding of the perceived challenges posed by AI on academic retention and critical thinking among vocational education undergraduates. It offers valuable insights for educational policymakers, administrators, and faculty members to develop informed strategies that not only mitigate the perceived risks associated with AI but also enhance its benefits. By prioritizing student concerns and fostering an environment that balances AI use with traditional educational practices, stakeholders can promote student success and cognitive development in the evolving educational landscape.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Educational institutions should develop and implement comprehensive policies and guidelines that regulate the use of artificial intelligence (AI) in teaching and learning. These policies should aim to control the extent of AI integration to ensure that students maintain essential academic retention and comprehension. A balanced approach that preserves traditional educational practices alongside technological advancements is crucial to mitigate the risks associated with AI reliance.

2. Students should be actively encouraged to minimize their over-reliance on AI tools, as excessive dependence may impede the development of critical thinking abilities. Educational programs should integrate activities and assignments specifically designed to foster critical thinking, reflective thinking, and independent problem-solving skills. By doing so, institutions can help mitigate the potential negative impacts of AI on students' cognitive capabilities, ensuring they remain engaged and proficient learners.

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