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ARTIFICIAL INTELLIGENCE TOOLS FOR ENHANCING LEARNING AMONG UNDERGRADUATE ADULT EDUCATION STUDENTS OF PUBLIC TERTIARY INSTITUTIONS IN ENUGU STATE

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Abstract

This study examined Artificial Intelligence (AI) tools for enhancing learning among undergraduate Adult Education students of public tertiary institutions in Enugu State. Specifically, it determined the extent to which ChatGPT and Virtual Reality (VR) can enhance learning and examined differences in students' responses across institutions. A descriptive survey design was adopted. The population and sample comprised 251 undergraduate Continuing Education and Development Studies students from the University of Nigeria, Nsukka; Enugu State University of Science and Technology; and Federal College of Education, Eha-Amufu, using census sampling. Data were collected using a researcher-developed 26-item Artificial Intelligence for Enhancing Learning Questionnaire (AIELQ), with reliability coefficients of 0.85 and 0.77. Data were analysed using mean, standard deviation, and Analysis of Variance (ANOVA). Findings revealed that ChatGPT enhances learning to a high extent, with a grand mean of 3.43, particularly in promoting independent learning, problem-solving, interactive learning, research support, and feedback. Similarly, VR enhances learning to a high extent, with a grand mean of 3.10, through immersive learning, interactive simulations, collaboration, engagement, and accessibility. ANOVA revealed no significant difference in students' responses regarding ChatGPT ($F = 6.596$, $p = .520$) and VR ($F = 3.624$, $p = .232$). The study concluded that ChatGPT and VR are useful tools for enhancing learning and recommended their integration into teaching alongside appropriate training and institutional support.

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Keywords: Artificial Intelligence Tools, Learning, Undergraduate, Adult Education Students, Public Tertiary Institutions

Introduction

Globally, Artificial Intelligence (AI) is transforming the education sector by enhancing personalized learning, automating administrative tasks, and improving student engagement through adaptive learning systems. In countries such as the United States, China, and Finland, AI tools like chatbots, intelligent tutoring systems, and virtual assistants are increasingly being adopted to support individualized learning experiences (Zawacki-Richter et al., 2019). AI is also being used to analyse student data and predict academic achievements. This enables institutions to offer targeted support (Holmes et al., 2021).

In Africa, the integration of AI into tertiary education is gradually gaining momentum, though challenges such as poor infrastructure, digital literacy gaps, and limited funding persist. Countries like South Africa, Kenya, and Rwanda have initiated policies to support AI-based education reforms (Chikondi & Mphande, 2022). According to UNESCO (2021), African governments and institutions are beginning to realize the potential of AI in enhancing teaching efficiency, learning analytics, and remote education

delivery. However, the pace of adoption remains uneven across the continent, often limited to pilot projects or elite institutions.

In Nigeria, the use of AI tools in tertiary institutions is still at an early stage, particularly in public universities. While some private institutions are beginning to explore AI-driven platforms for e-learning, most public institutions struggle with basic ICT infrastructure (Olanrewaju & Adebayo, 2021). Nevertheless, scholars agree that the integration of AI in Nigerian higher education has the potential to revolutionize teaching and learning, especially among adult learners who often require more flexible and personalized learning paths (Eze et al., 2022). The Federal Ministry of Education has expressed interest in leveraging AI for educational transformation, but effective implementation remains a challenge due to policy gaps and resource limitations.

Artificial Intelligence (AI) is an emerging digital technology with significant potential to enhance learning experiences among undergraduate Adult Education students. It involves computational systems capable of performing human-like cognitive functions such as learning, reasoning, problem-solving, perception, and language understanding (Russell & Norvig, 2016). The European Commission (2018) describes AI as systems capable of analysing their environment and taking relatively autonomous actions to achieve specific goals, while Essien et al. (2019) view it as a branch of computer science concerned with developing computers that behave like humans. Operationally, AI refers to the transfer of human intelligence to machines to enable them to learn, reason, solve problems, and communicate instructions. Its application in education therefore offers opportunities for improving teaching and learning among undergraduate Adult Education students.

Artificial intelligence systems adapt and improve the performance of students through data-driven processes (Mitchell, 2015). In the aspect of tertiary educational, AI has revolutionized traditional teaching methods by providing personalized learning experiences, tailored to individual student's needs (VanLehn, 2016). Through the application of AI algorithms, educational platforms can analyse vast amounts of data to identify patterns, predict student behaviour, and offer real-time feedback, thereby enhancing the efficacy of instruction and promoting deeper learning (Baker, 2016). Artificial intelligence, if properly utilized in tertiary institutions will enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State.

Learning is one of the concepts that has attracted the attention of many scholars. According to Li and Zhang (2021), learning is described as a process in which individuals acquire new knowledge, behaviors, skills, or values through study, experience, or teaching. This definition highlights the dynamic and ongoing nature of learning, where individuals continuously absorb and apply information in various forms to enhance their capabilities. The emphasis is placed on the acquisition and application of knowledge as a fundamental aspect of learning. In the view of Jones and Brown (2019), learning is defined as a transformative process where individuals undergo personal change through experiences that challenge their existing knowledge and viewpoints. This definition highlights the idea that learning goes beyond mere acquisition of facts and involves a deeper, reflective transformation that reshapes how individuals perceive and interact with the world around them. It involves not only cognitive change but also emotional and social growth. In this study, learning is defined as the process of acquiring new knowledge which leads to change of behaviour among undergraduate students of adult education in public tertiary institutions.

Undergraduate student is a learner enrolled in a bachelor's degree programme at a college or university, pursuing foundational knowledge and skills in a specific academic discipline (Bureau of Labor Statistics, 2019). In most educational systems, undergraduate students are those who have completed secondary education and are undertaking their first degree at a college or university. Supporting the above, Gallagher and Smith (2018) stated that an undergraduate student is generally described as an individual who is enrolled in a higher education programme leading to the attainment of a bachelor's degree. Additionally, Kim and Sax (2015) noted that undergraduate students are those pursuing their first bachelor's degree at a higher education institution.

Undergraduate students are a diverse group with varying socio-economic, cultural, and educational backgrounds, including differences in prior academic achievement and family income (Kim & Sax, 2017). They are also in a transitional stage of personal, social, and intellectual development, characterized by identity formation, exploration, and the development of critical-thinking abilities (Arnett, 2015). Undergraduate students generally pursue higher education to acquire knowledge, obtain academic qualifications, and achieve career or research goals (Kuh et al., 2018). In addition, many are familiar with digital technologies and use them for communication, research, and learning, while their diverse learning preferences influence their engagement with instructional materials and teaching methods (Jones & Shao, 2017).

Tertiary institutions are post-secondary educational establishments that provide advanced education, training, degree programmes, diplomas, and professional or vocational qualifications through universities, colleges, polytechnics, and technical institutions (Marginson, 2016; UNESCO, 2015). They encompass diverse institutions, ranging from research-oriented universities to applied science and professional training institutions (Altbach et al., 2019). In Enugu State, this study focuses on three public tertiary institutions that offer Adult Education as an undergraduate programme: the University of Nigeria, Nsukka; Enugu State University of Science and Technology; and Federal College of Education, Eha-Amufu. The utilisation of artificial intelligence in teaching and learning among Adult Education students in these institutions is therefore important for improving educational experiences and outcomes.

The utilisation of AI in teaching undergraduate Adult Education students offers several benefits, particularly personalized and adaptive learning. AI can analyse students' learning patterns, strengths, weaknesses, and preferences to provide customized content, real-time feedback, and targeted support, thereby improving engagement, motivation, understanding, and mastery of academic concepts (Koedinger et al., 2015; Baker, 2017; VanLehn, 2016). It also helps educators accommodate diverse learning styles and abilities while AI-powered assessment tools identify learning difficulties and recommend appropriate interventions (Blikstein, 2018; Baker, 2016). Furthermore, AI promotes interactive and collaborative learning through peer activities, group projects, virtual simulations, and instant academic support through tools such as ChatGPT and virtual reality (D'Mello & Graesser, 2019; Holstein et al., 2019; VanLehn, 2016). Overall, AI enhances personalized learning, adaptive instruction, assessment, collaboration, and academic support among undergraduate Adult Education students.

There are different classifications of artificial intelligence, however, this study will adopt the most common classification according to Betz (2024) who classified artificial intelligence into seven namely: Narrow AI, Artificial General Intelligence, Artificial Superintelligence, Reactive Machine AI, Limited Memory AI, Theory of Mind AI, and Self-Aware AI. Although all these are classifications of Artificial intelligence, this study will focus on Narrow AI. According to Russell and Norvig (2016), Narrow AI also known as Weak AI refers to AI systems that are designed to perform specific tasks and operate within a limited context. These systems do not possess generalized intelligence but are capable of outperforming humans in particular areas, such as image recognition or language translation. That means that Narrow AI is confined to its specialized domain of operation. Again, Goertzel (2017) defines Narrow AI as AI that is developed to handle particular tasks without having the capability to perform beyond those tasks. These systems can demonstrate expert performance within their domain but cannot apply knowledge across different tasks. Narrow AI is the most common form of AI currently deployed in applications like search engines, recommendation systems, and self-driving cars.

The examples of Narrow AI include Intelligent Tutoring Systems (ITS), Adaptive Learning Platforms, Automated Grading and Feedback, Language Learning Apps, AI-Powered Educational Games, Chatbots, Virtual reality (Fryer, et al, 2017), Predictive Analytics, Personalized Learning Pathways, AI in Special Education, and Content Recommendation Systems (Sampson & Ifenthaler, 2016). However, this study seeks to ascertain the extent to which artificial intelligence such as ChatGPT and virtual reality enhance learning among undergraduate adult education students of tertiary institutions in Enugu State.

ChatGPT can enhance learning among undergraduate Adult Education students by functioning as a virtual tutor that provides personalized assistance, answers questions, clarifies concepts, and gives feedback on assignments (D'Mello & Graesser, 2019). It also supports interactive learning through dialogue, simulations, and role-playing, helping students develop language and critical-thinking skills (Holstein et al., 2019). By analysing students' interactions and performance, ChatGPT can provide personalized learning materials and pathways (VanLehn, 2016). Furthermore, it offers continuous academic assistance, study guidance, and access to learning resources beyond classroom hours (Jones & Shao, 2017), while providing timely feedback and identifying areas for improvement (Baker, 2016).

Virtual Reality (VR) also enhances learning by creating immersive environments that simulate real-world situations and promote interactive and experiential learning (Lee & Wong, 2019). It can increase students' engagement and motivation (Suh & Lee, 2017), provide opportunities to apply theoretical knowledge through practical simulations (Dalgarno & Lee, 2019), and improve accessibility and flexibility by enabling students to access learning experiences remotely and accommodate diverse learning preferences (Chen & Weng, 2018).

Additionally, virtual reality enables collaborative learning experiences among undergraduate adult education students, allowing them to interact with peers and instructors in virtual environments. Through VR-based group activities and simulations, students can collaborate on projects, discuss course concepts, and solve problems together (Wu, Lee, Chang, & Liang 2019). Therefore, virtual reality can enhance learning among undergraduate adult education students in tertiary institutions by providing immersive learning environments, increasing engagement and motivation, offering experiential learning opportunities, enhancing accessibility and flexibility, and facilitating collaborative learning experiences which also enhance personalized learning.

This study anchored on the Technology Acceptance Model (TAM) Davies (1989). The theory was developed to understand and predict users' acceptance and adoption of technology. TAM primarily focuses on two key determinants that influence users' acceptance of technology: perceived usefulness (PU) and perceived ease of use (PEOU). The theory is applicable to the study because it explains why people adopt and use a particular technology. Learning among undergraduate students of adult education has been influenced by many factors that can be categorized into various domains, including individual characteristics, social and environmental factors, institutional factors, and pedagogical approaches. Although these factors affect learning among undergraduate students of adult education, there is need to use artificial intelligence. To the best of the researcher's knowledge, the extent of use of artificial intelligence in tertiary institutions in Enugu state has not been ascertained. This prompted the researcher to ascertain the extent of utilization of artificial intelligence to enhance learning in tertiary institutions in Enugu state. Therefore, the study seeks to ascertain the artificial intelligence tools for enhancing learning among undergraduate adult education students of public tertiary institutions in Enugu State.

Statement of the Problem

The integration of Artificial Intelligence (AI) in education has become relevant because it offers innovative tools and strategies for enhancing learning experiences. However, despite its potential, there are limited studies on the application of AI tools such as ChatGPT and Virtual Reality (VR in the learning process of undergraduate adult education students, particularly in public tertiary institutions in Enugu State.

Adult education students, who often face unique challenges such as balancing studies with work and family responsibilities, requires the use of Artificial Intelligence to create a learning environment that cater to their specific needs. These students also often exhibit a range of learning styles, paces, and preferences that necessitate more personalized approaches to education. To the best of the researcher's knowledge, the extent of use of artificial intelligence has not been ascertained in tertiary institutions in Enugu state, hence, this prompted the researcher to ascertain the utilization of artificial intelligence to enhance learning in tertiary institutions in Enugu state. However, the extent to which AI-driven tools can

be effectively utilized to enhance their learning experiences has not been ascertained in Enugu State's public tertiary institutions.

Therefore, the problem of this study is to ascertain artificial intelligence tools for enhancing learning among undergraduate adult education students of public tertiary institutions in Enugu State.

Purpose of the study

The general purpose of the study is to ascertain artificial intelligence tools for enhancing learning among undergraduate adult education students of public tertiary institutions in Enugu State. Specifically, the study sought to

1. Find out the extent to which ChatGPT is used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State.
2. Ascertain the extent to which Virtual Reality (VR) is used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State

Research Questions

The study was guided by the following research questions

1. To what extent can ChatGPT be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State?
2. To what extent can Virtual Reality (VR) be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State?

Hypotheses

The following hypotheses formulated was tested at 0.05 level of significance

HO_1. There is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which ChatGPT can be used to enhance learning.

HO_2. There is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which Virtual Reality can be used to enhance learning.

Methods

The study adopted descriptive survey research design. This design is considered appropriate for the study since the study collected and describe in a systematic manner, information obtained from undergraduate adult education students of tertiary institutions in Enugu State. The population of the study comprised 251 Continuing Education and Development Studies undergraduate students in University of Nigeria, Nsukka; Enugu State University of Science and Technology; and Eha-Amufu College of Education. The sample size for this study was 251. Census sampling technique was used to sample the entire population. The instrument for data collection was a 26-item researcher developed questionnaire titled Artificial Intelligence for Enhancing Learning Questionnaire (AIELQ) with Likert four points rating scale of Very High Extent (VHE) (4-points), High Extent (HE) (3-points), Low Extent (LE) (2-points), and Very Low Extent (SD) (1point). The instrument was face validated by three experts who assessed the items in terms of relevance to the content, appropriateness and adequacy in addressing the purpose of the study. The instrument was trial tested and responses analysed using Cronbach Alpha method to determine the reliability co-efficient of 0.85 and 0.77. The researcher collected the data for the study virtually. The data collected for the study was analysed using mean, standard deviation, and Anova statistics.

Results

Research Questions One:

To what extent can ChatGPT be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State?

Table 1: Mean responses on extent ChatGPT can be used to enhance learning among undergraduate adult education students of public tertiary institutions

S/N	Item Statement	Mean	SD	Decision
1	Offering explanations to difficult concepts	2.84	.61	HE
2	Providing resources tailored to the individual needs of learners	2.94	.53	HE
3	Helping to reinforce understanding of lessons	2.72	.65	HE
4	Providing 24/7 access to online resources to learners.	2.74	.60	HE
5	Promoting independent learning	3.74	.44	HE
6	Equipping students with problem-solving skills	3.89	.31	HE
7	Provide interactive learning experience to students	3.53	.67	HE
8	Helping in language learning	3.45	.66	HE
9	Providing instant feedback and corrections to students	3.16	.55	HE
10	Facilitating collaborative learning	3.61	.48	HE
11	Assisting students with their research by providing quick access to information	3.24	.45	HE
12	Helping to formulate research questions	3.39	.86	HE
13	Conducting preliminary literature reviews	3.13	.52	HE
14	Helping learners understand and perform data analysis by explaining statistical concepts	3.63	.48	HE
15	Guiding learners through the use of software tools	3.39	.50	HE
16	Helping students to interpret results.	3.48	.64	HE
	Grand Mean	**3.43**	**0.56**	**HE**

The result in Table 1 shows that all the items had mean scores ranging from 2.72 to 3.89, which are above the cutoff point of 2.50, indicating that to a high extent (HE) ChatGPT can be utilised to enhance learning among undergraduate adult education students of public tertiary institutions. The grand mean of 3.43 confirms that all the items can be utilised to enhance independent learning, problem-solving, interactive learning, and access to educational resources to a high extent. The standard deviation values (ranging from 0.31 to 0.86) show consistency in the respondents' opinions.

Hypotheses One:

There is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which ChatGPT can be used to enhance learning.

Table 2: Summary of Anova testing among institutions on the extent to which ChatGPT can be used to enhance learning

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	3.469	2.000	2.407	6.596	0.520	Not Significant
Within Groups	79.726	248.000	0.336			
Total	83.195	250.000				

Table 2 presents the ANOVA result testing whether there is a significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) from the University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu College of Education on the extent to which ChatGPT can be used to enhance learning. The result shows that the calculated F-value is 6.596 with a corresponding p-value (Sig.) of 0.520, which is greater than the 0.05 level of significance. This indicates that there is no significant difference among the mean responses of students from the three institutions. Therefore, the null hypothesis is retained, meaning that students across the three institutions do not differ significantly in their opinions on the extent to which ChatGPT can be used to enhance learning. This implies that ChatGPT is generally perceived as an effective learning enhancement tool by undergraduate adult education students across all the studied public tertiary institutions.

Research Question Two:

To what extent can Virtual Reality (VR) be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State?

Table 3: Mean responses on extent Virtual Reality (VR) can be used to enhance learning among undergraduate adult education students of public tertiary institutions

S/N	Item Statement	Mean	SD	Decision
17	Making complex and abstract concepts more tangible and understandable.	3.74	0.59	HE
18	Allowing students to visualize and interact with complex scientific concepts.	2.90	0.46	HE
19	Enabling the exploration of historical events or geographical locations as if they were there.	2.89	0.45	HE
20	Offering interactive simulations where students can perform experiments in a safe and controlled environment.	2.86	0.41	HE
21	Incorporating game-based learning elements which can make learning more fun and engaging.	2.91	0.45	HE
22	Facilitating collaboration among learners even globally.	3.00	0.61	HE
23	Connecting students with peers and experts from around the world	3.09	0.59	HE
24	Enabling students to develop soft skills, such as communication and problem-solving skills.	2.90	0.66	HE
25	Making the learning more accessible and inclusive	2.96	0.62	HE
26	Supporting students with disabilities by providing customized learning experiences that accommodate their needs.	3.70	0.47	HE
	Grand Mean	**3.10**	**0.53**	**HE**

The result in Table 3 shows that all items had mean scores ranging from 2.86 to 3.74, with a grand mean of 3.10, indicating a high extent (HE). This implies that undergraduate adult education students perceive Virtual Reality (VR) as highly effective in enhancing learning. VR helps to make complex concepts more understandable, promotes interaction and engagement, supports collaboration, and enhances accessibility for learners, including those with disabilities. The standard deviation values (ranging from 0.41 to 0.66) show consistency in their respondents' opinions were consistent.

Hypotheses Two:

There is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which Virtual Reality can be used to enhance learning.

Table 4: Summary of Anova testing among institutions on the on the extent to which Virtual Reality can be used to enhance learning

	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	1.861	2.000	0.935	3.624	0.232	Not Significant
Within Groups	70.447	248.000	0.291			
Total	72.308	250.000				

Table 4 presents the ANOVA result on the difference in mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) from the University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu College of Education on the extent to which Virtual Reality (VR) can be used to enhance learning. The result shows that the calculated F-value (3.624) has a significance value (Sig.) of 0.232, which is greater than the alpha level of 0.05. This means that the difference in the mean responses among the three institutions is not statistically significant. Hence, the null hypothesis stating that there is no significant difference in the mean responses of undergraduate students of the three institutions on the extent to which Virtual Reality can be used to enhance learning is retained. This finding implies that students across the three institutions share similar views on the effectiveness of Virtual Reality in enhancing learning. They collectively perceive that VR can be used to a high extent to make learning more engaging, interactive, and accessible, regardless of institutional differences.

Discussion

The finding of the study showed that ChatGPT can be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State to a high extent. This is because ChatGPT explains difficult concepts, provides resources tailored to the individual needs of learners, reinforce understanding of lessons, provides 24/7 access to online resources to learners, promotes independent learning equip students with problem-solving skills, and provide interactive learning experience to students. This finding was supported by Pallivathukal et al. (2023) who found that awareness

of ChatGPT's academic utility varied among students. Most participants had positive attitudes, despite concerns about data accuracy, plagiarism, ethical issues, and dependency. It was found that MBBS students were significantly more likely to use ChatGPT for academic purposes compared to BDS and FIS students. Final-year students were also the highest users. A majority (45.8%) used ChatGPT for specific assignment sections while doing most of the work independently, while 9.3% relied heavily on it, and 41.1% did not use it at all. Additionally, Alejandro et al. (2023) found that 71.3% of participants used ChatGPT because it is fast and provides accurate answers. Also, 23.15% cited its free and easy access as a reason for use. Linear regression analysis revealed a positive correlation between students' use of ChatGPT and the dependent variables of assignment completion, affordability, and preference

Finding also showed that there is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which ChatGPT can be used to enhance learning. The implication of this finding is that undergraduate students of Continuing Education and Development Studies (CEDS) across the three institutions, University of Nigeria, Nsukka; Enugu State University of Science and Technology; and Eha-Amufu College of Education, have a similar perception regarding the extent to which ChatGPT can be used to enhance learning. This means that institutional affiliation does not influence students' views about the usefulness of ChatGPT as a learning tool.

Finding from research question two showed that to a high extent Virtual Reality (VR) can be used to enhance learning among undergraduate adult education students of public tertiary institutions in Enugu State. This is because virtual reality makes complex and abstract concepts more tangible and understandable, and allows students to visualize and interact with complex scientific concepts. Virtual reality also enables the exploration of historical events or geographical locations as if they were there, provide interactive simulations where students can perform experiments in a safe and controlled environment, and incorporate game-based learning elements which can make learning more fun and engaging. Supporting the above finding, Chen, et al (2024) examined how virtual reality experiential learning improved undergraduate students' knowledge and evaluation skills relating to assistive technology (AT) for older adults and individuals with disabilities; and found that the experimental group (VR) showed a significant 20.67-point improvement in knowledge ($p < 0.05$) compared to the control group (2D video), which only improved by 3.67 points ($p = 0.317$). Additionally, the VR group scored significantly higher (+2.17 points) on the REA Form ($p < 0.05$), indicating enhanced evaluation skills. Virtual reality also enables the exploration of historical events or geographical locations as if they were there. Rafiq, et al (2022) found that VR engagement helped students focus on discipline-specific content (e.g., robots for electronics students and power plants for electrical students). Key themes identified included improved visual experiences and perceived educational benefits of VR.

Findings further revealed that there is no significant difference in the mean responses of undergraduate students of Continuing Education and Development Studies (CEDS) of University of Nigeria, Nsukka, Enugu State University of Science and Technology, and Eha-Amufu college of education on the extent to which Virtual Reality can be used to enhance learning. The implication of this finding is that undergraduate students of Continuing Education and Development Studies (CEDS) in the three institutions share a common perception about the use of Virtual Reality (VR) in enhancing learning. This means that their views on the effectiveness and usefulness of VR as a learning tool are not influenced by their institutional differences. Therefore, educational planners and lecturers can implement uniform strategies for integrating Virtual Reality into teaching and learning across these institutions, as students have a similar level of acceptance and readiness to use the technology for academic purposes.

Conclusion

Based on the findings of the study, it was concluded that artificial intelligence tools such as ChatGPT and Virtual Reality (VR) can be used to enhance learning to a high extent among undergraduate adult education students of public tertiary institutions in Enugu State. The findings further reveal that there is no significant difference in the mean responses of students from the University of Nigeria, Nsukka; Enugu State University of Science and Technology; and Eha-Amufu College of Education regarding the extent of their usefulness. This implies that students across the institutions share similar positive perceptions of these technologies as effective tools for improving learning experiences.

Recommendations

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

1. Lecturers and instructors in tertiary institutions should integrate ChatGPT into teaching and learning activities to support students in understanding difficult concepts, completing assignments, and engaging in self-directed learning. Training workshops should also be organized to help both students and lecturers effectively utilize ChatGPT as an academic support tool.
2. Tertiary institutions should invest in Virtual Reality facilities and software to create immersive learning experiences, especially in courses that require practical demonstrations. Educators should be trained on how to apply VR tools to simulate real-life learning situations that enhance students' comprehension and participation.

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