International Journal of Multidisciplinary Research and Growth Evaluation.

Enhancing Learning Experience of Business Education Students through Integration of Artificial Intelligence-Driven Augmented Reality

Paul-Mgbeafulike VS [1*], Udogu Anthony N [2], Ikpeama Frednora Uchenna [3]
[1, 3] Department of Technology and Vocational Education, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria
[2] Department of Criminology and Security Studies, Chukwuemeka Odumegwu Ojukwu University, Igbariam, Anambra State, Nigeria

* Corresponding Author: **Paul-Mgbeafulike VS**

Article Info

ISSN (online): 2582-7138
Volume: 05
Issue: 05
September-October 2024
Received: 03-07-2024
Accepted: 06-08-2024
Page No: 176-181

Abstract
This study investigated how integrating Artificial Intelligence driven Augmented Reality (AR) could be used to enhance learning experience of business education students in Public Universities in Ebonyi State. Two purposes of the study with their corresponding research questions and hypotheses guided the study. The study adopted descriptive survey design. Population for the study consists of 17 business educators in Alex-Ekwueme Federal University Ndufu-Alike Ikwo and Ebonyi State University, Abakaliki. There was no sampling since the population was manageable and was used for the study. A structured questionnaire validated by three experts was used as instrument for data collection. Reliability of the instrument was ensured by trial-testing it at Ebonyi State College of Education, Ikwo and responses gotten were correlated and it yielded an index of 0.77. Responses to the questionnaire items were analyzed using mean and standard deviation while the null hypothesis was tested using P-value at 0.05 level of significance. Findings of the study revealed that Artificial Intelligence driven Augmented Reality could be used in providing students with personalized learning experiences, understanding individual students' learning styles, understanding individual students' learning needs, enhancing students' self-directed learning among others. The findings also revealed that challenges to integration of Artificial Intelligence (AI) driven Augmented Reality (AR) in business education includes Inadequacy of reliable and fast internet connections, Lack of lecturers with AI-driven AR skills, High cost of AI-driven AR infrastructure, Paucity of fund for training of staff on AI-driven AR skills among others. The study recommended among others that University management should provide funds for procurement and installation of augmented reality resources in business education laboratories as this will increase students access to emerging technologies.

DOI: https://doi.org/10.54660/.IJMRGE.2024.5.5.176-181

Keywords: Artificial Intelligence, Business education, Descriptive survey design, Public Universities

Introduction

Technologies have continually changed exploration in various academic fields to conform to contemporary innovations and developments. Some of such innovations making waves in global academic scene are the use of artificial intelligence which has been seen as cross-fertilization and intersection of different specialty areas such as sciences, logic, computer science, and communication studies among others (Acar and Van De Ven, 2018) [2]. These constituents of artificial intelligence were embodied into it to facilitate operations that are relative to the nature of human intelligence and allow it to develop computer programs seemingly simulating human behavior and providing intelligent responses. The unique qualities of artificial

intelligence has led to it gradual penetration in all human activities especially in education where it is used in improving educational system (Bersin, 2017; Godoy, 2020) [5, 11].

To achieve this, artificial intelligence uses different other technologies such as Augmented Reality (AR) and Virtual Reality (VR). These two tools equip users with the capability to experience digitally produced content in actual and virtual arenas (Chen and Wang, 2019) [7].

Augmented reality (AR) are technologies that overlays digital information, images or objects into the real world. By addition of virtual components such videos, sounds among others, AR blends real world and digital world aimed at creating hybrid interactive environment. According to Rouse (2015) [8], AR is the integration of varying digital contents with other contents from the user's environment in real time. Such digital contents may include live videos, sounds, signals that are created to interact with the user and the environment in the real time. Azuma in Avila-Garzon, Bacca-Acosta, Kinhuk, Duarte and Juan (2021) [4] explained that AR allows users to interact with digital information that are overlaid on the real world environment. This interaction is possible as Augmented Reality affixes layers of digital elements such as live videos on real world content to enhance user's experience. Though different from each other, individuals sometimes find it difficult to distinguish between augmented reality and Virtual reality.

Virtual Reality (VR) is computer generated simulation of a three-dimensional environment which allows the user to experience and interact within a virtual environment that appeals as a real world environment (Bishop, 2019). VR technology gives the user an immersed experience as the user feel as been placed inside the virtual environment. VR uses different technologies to create immersive and interactive user experience as the user is been transported to a virtual world. Bersin (2017**)** [5] explained that virtual environment is usually designed to appeal as real as possible with lifelike visuals, sounds, motions among others. VR technology could be used in playing games, exploring new world, engaging users in simulation trainings among others. As one of the emerging artificial intelligence driven technologies, VR could be integrated into teaching and learning of business education programmes to enhance students' learning experience.

Business education is one of the vocational programmes offered in tertiary institutions across the globe. One of the major aims of business education is to prepare individuals with requisite skills for effective participation in the business world. Nwosu, crussdale and ofulue (2018) [15] explained that business education prepares students towards becoming productive employees or become self-employed in the business world. Udo in Nwogu and Diseph (2020) [14] described Business Education as a programme that helps individuals to develop skills and understanding that will assist them in entering the business world and become self-reliant. Business education is made up two aspects which are: Vocational Business Education (VBE) and Business Teacher Education (BTE). Utoware, Kren-Ikidi and Apreala in Ofulue, Nwagwu and Ogbu (2020) [16] described vocational business education as an aspect of business education that focuses on the preparing individuals for career in business. These individuals are equipped with relevant skills for inclusive participation in the world of business as producer or intelligent consumer of business products. On the other hand, Business Teacher Education is an aspect of business education that prepares students with skills for a successful career as teachers of business subjects. Ofulue, Nwagwu and Ogbu (2020) [16] explained that this aspect of business education produces individuals that impart business knowledge at various levels of education. To be abreast with changes in education brought by technological advances, learning experiences of business education students need to be enhanced using technologies such as augmented reality and virtual reality.

As emerging technologies in education, augmented reality driven by artificial intelligence could be used in the classroom to supplement teaching and learning thereby enhancing students learning experience. Jayesh (2023) [12] opined that usage of augmented reality in education will allow students to explore other learning opportunities using virtual environment. Business education students can use these technologies to generate and explore business related virtual environment using their computers, keyboards, computerized headsets among others. With these resources, they can create virtual environment that is immersive and interactive thereby becoming motivated to explore and experience different lifelike virtual business environments. Acar (2018) [2] noted that Artificial intelligence driven augmented reality and virtual reality can make students to actively participate in teaching and learning activities as they gain continual immersive and interactive experience. In this regard, business educators can use these technologies in capturing student's attention and promote their active participation in teaching and learning activities. Artificial intelligence driven augmented reality and virtual reality can provide business education students with the opportunity of using games to engage in virtual business transactions.

Statement of the Problem

The emergence of varying technologies has continually pose challenges to development and implementation of curricula of different educational programmes. In order to abreast these innovations in education, institutions are making efforts to identify technologies that are suitable to their varying programmes. As one of the programmes that are focused on producing individuals for effective participation, business education curriculum needs to integrate these technologies to enhance students learning experience. Imperative of integrating artificial intelligence driven augmented reality and virtual reality to enhance business education students learning experience cannot be overemphasized. Despite the growing need for immersive and interactive learning experiences among business education students, it is obvious that traditional teaching methods are still dominating their entire teaching and learning of business education courses. This undoubtedly has led to passive learning, limited student's engagement and inadequate preparation of the students to handle complexities in this 21st century. Integration of Artificial Intelligence driven Augmented Reality (AR) has the potential revolutionizing students learning experience but it is heartbreaking that its adoption in business education remains limited due to varying challenges. In view of this obvious challenge, the students are lagging in the area of enjoying opportunities brought by Artificial Intelligence driven Augmented Reality (AR) for increased motivation and enhanced learning experience. Therefore, this study aimed to investigate how integrating Artificial Intelligence driven Augmented Reality (AR) can

enhance learning experience of business education students in public universities in Ebonyi State.

Purpose of the Study

The main purpose of the study was to investigate how integrating Artificial Intelligence driven Augmented Reality (AR) could be used in enhancing learning experience of business education students in public universities in Ebonyi State.

Specifically, the study sought to investigate

1. How Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State.
2. Challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State.

Research Questions

The following research questions guided the study

1. How could Artificial Intelligence driven Augmented Reality be used in enhancing learning experience of business education students in public universities in Ebonyi State?
2. What are the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State?

Hypotheses

^{HO1} There is no significant difference in the mean rating of business educators from state and federal public universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State.

^{HO2} There is no significant difference in the mean rating of male and female business educators on challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State.

Methodology

The study was to investigate how integrating Artificial Intelligence driven Augmented Reality (AR) could be used in enhancing learning experience of business education students in public universities in Ebonyi State. Descriptive survey design was used to access the opinions of Business Educators from Public Universities in Ebonyi State. The population was made of 17 Business Educators from Ebonyi State University (EBSU), Abakaliki and Alex Ekwueme Federal University (AE-FUNAI), Ndufu-Alike Ikwo. The entire population was used as it is manageable. A structured questionnaire that was divided into two parts (Part A and Part B) was used for data collection. Part A was used to collect personal data of the respondents while part B contained 16 items used in answering the research questions. Reliability of the instrument was ensured by trial-testing it at Ebonyi State Collage of Education, Ikwo and responses gotten were correlated and it yielded an index of 0.77. A total of 17 copies of the questionnaire were distributed and were all correctly filled and returned giving 100 percent on return. Mean and standard deviation were used to analyze responses to the items in the questionnaire. Responses to the research questions were analyzed thus: items with 3.5 and above were rated as Strongly Agreed (SA), items with mean score of 2.5-3.49 were rated as Agreed (A); items with mean score of 1.5-2.49 were rated as Disagreed (D) and items with mean score of 0.1-1.49 were rated as Strongly Disagreed (SD). The hypotheses were tested using t-test at alpha level of 0.05 level of significance.

Results

Research Question one

How Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State.

Table 1: Mean ratings of the responses on how Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State

S/N	Artificial Intelligence driven Augmented Reality could be used in:	X	SD	Decision
1.	Providing students with personalized learning experiences	3.01	0.65	Agreed
2.	Understanding individual students' learning styles	2.74	0.70	Agreed
3.	Understanding individual students' learning needs	2.62	0.69	Agreed
4.	Enhancing students' self-directed learning	3.22	0.81	Agreed
5.	Promoting inclusivity of all students in the learning process	2.59	0.90	Agreed
6.	Integrating other technologies into their learning engagements	3.31	0.76	Agreed
7.	Equipping students with problem-solving skills	3.08	0.54	Agreed
8.	Equipping students with critical thinking skills	3.34	0.65	Agreed
9.	Equipping students with Communication skills	3.27	0.71	Agreed
10.	Enhancing cooperative learning among students	3.68	0.48	Agreed
	Grand	3.09	0.69	Agreed

Table one shows the mean and standard deviation ratings of the responses on how Artificial intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State. The analysis showed that all the items were rated within the range of 2.50-3.49. The grand mean of 3.09 implies that the respondents agreed that all the items were how Artificial intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in public universities in Ebonyi State.

Research question two

What are the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State?

Table 2: mean ratings of the responses on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State

S/N	Challenges to integration of Artificial Intelligence (AI) driven Augmented Reality (AR)	X	SD	Decision
1.	Inadequacy of reliable and fast internet connections	3.60	0.53	Agreed
2.	Lack of lecturers with AI-driven AR skills	3.52	0.47	Agreed
3.	High cost of AI-driven AR infrastructure	3.88	0.69	Agreed
4.	Paucity of fund for training of staff on AI-driven AR skills	2.94	0.82	Agreed
5.	Unwillingness of lecturers to change from traditional teaching methods to AI-driven AR	2.36	0.79	Disagreed
6.	Challenges of developing AI-driven AR instructional content	2.57	0.72	Agreed
7.	Challenges of addressing privacy and security issues	3.00	0.41	Agreed
	Grand	3.12	0.63	Agreed

The results in table two shows the mean ratings of Business Educators responses on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public Universities in Ebonyi State. All the items were rated within the range of 2.5-3.49 except item 5 that had mean rating of 2.36. Grand mean of 3.12 implies that business educators agreed that there are challenges affecting the integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State.

Hypotheses

Ho^1: There is no significant difference in the mean rating of business educators from state and federal public universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students in Public Universities in Ebonyi State.

Table 3: Summary of t-test analysis of responses from business educators from State and Federal Public Universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing learning experience of business education students

Institution	Mean	Standard deviation	Df	t-cal	P-value	Decision
Federal	3.23	0.92	15	0.60	2.13	Not significant
State	3.51	0.77				

Table 3 above shows that P-value of 2.13 at 15 degree of freedom is greater than the criterion value of 0.05 (P-value = 2.13 > 0.05). This means that there is no significant difference in the mean ratings of the responses from Business Educators from State and Federal Public Universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing business education students learning experience in public universities in Ebonyi State.

Ho^2 There is no significant difference in the mean rating of male and female Business Educators on challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in Public Universities in Ebonyi State.

Table 4: Summary of t-test analysis of responses from male and female business educators on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities.

Gender	Mean	Standard deviation	Df	t-cal	P-value	Decision
Male	3.16	1.01	15	0.56	2.13	Not Significant
Female	2.94	0.59				

Table 4 shows the mean rating of male and female business educators on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State. Detailed analysis showed that mean responses of male and female respondents did not differ significantly as the P-value was greater than the criterion value. That is, the P-value of 2.13 is greater than the alpha level of 0.05. This means that the mean response of male and female respondents on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State did not differ significantly.

Discussion of findings

Result of the study as shown in table 1 revealed that all the items were rated within the range of 2.5 -3.49 with a grand mean of 3.09. This implies that the respondents agreed that Artificial Intelligence driven Augmented Reality could be used in providing students with personalized learning experiences, understanding individual students' learning styles, understanding individual students' learning needs, enhancing students' self-directed learning, promoting inclusivity of all students in the learning process, integrating other technologies into their learning engagements, equipping students with problem-solving skills, equipping students with critical thinking skills, equipping students with Communication skills and enhancing cooperative learning among students. These findings are in support of study by Abad-Segura, González-Zamar, Luque-de and Morales (2020) when they explained that augmented reality creates opportunities for natural interactions between the user and technologies, when integrated into education will help learners to improve on their communication skills which will lead to improved learning experience. AR devices creates opportunity for students to view the real world environment overlaid instructional text and applicable digital content projected on it thereby making learning to be more stimulating. Obviously, integrating augmented reality in teaching and learning will expose the students to computer simulated environment that combines real world and virtual environment in the learning process thereby providing them with wide range areas to explore (Correia, Fonseca, Paredes,

Martins, and Morgado, 2016). Dube and Ince (2019) explained that augmented reality allows user to be engulfed with the instructional context thereby focusing their attention on the real world which improves their learning experience. The communication skills of the students could be enhanced by engaging them in competitions using the augmented reality resources. By engaging the students on creative communication and participation in classroom activities using augmented reality resources, they could be inspired to be innovative thinkers and problem solvers that are equipped for the challenges of the future workforce (Bishop, 2019). AI driven AR can improve student's critical thinking abilities by guiding them towards exploring multiple perspectives and access relevant information in a dynamic and interactive environment. Ojode, Wolde and Claiborne (2021) opined that integrating technologies into business education programme will make teaching and learning to be participatory thereby improving students learning experience. Analysis of hypothesis one in table 3 shows mean ratings of responses of business educators from State and Federal Public Universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing business education students learning experience. The P-value of 2.13 is greater than the alpha level of 0.05, therefore, the null hypothesis was accepted. This therefore means that there is no significant difference in the mean ratings of the responses of Business Educators from State and Federal Public Universities on how Artificial Intelligence driven Augmented Reality could be used in enhancing business education students learning experience in public universities in Ebonyi State.

Result of the study as shown in table 2 revealed that all the items were rated within the range of 2.5 -3.49 except item 5 that was rated within the range of 1.5-2.49. This means that the respondents agreed to all the items except item 5. With the grand mean of 3.12, it implies that the respondents agreed that Challenges to integration of Artificial Intelligence (AI) driven Augmented Reality (AR) includes; Inadequacy of reliable and fast internet connections, Lack of lecturers with AI-driven AR skills, High cost of AI-driven AR infrastructure, Paucity of fund for training of staff on AI-driven AR skills, Challenges of developing AI-driven AR instructional content and Challenges of addressing privacy and security issues among others. Item 5 had mean rating that was within the range of 1.5-2.49 and this shows that the respondents disagreed that Unwillingness of lecturers to change from traditional teaching methods to AI-driven AR was not a challenge to integration of Artificial Intelligence (AI) driven Augmented Reality. Nasser, Lim, Al-Samarraiec, Reem, Ahmed and Samer (2020) found in their study that some of the challenges affecting the adaption of augmented reality in teaching and learning include lack of competent teachers, limited AR instructional designs and limited AR resources among others. The use of augmented reality in education requires high technical knowledge to generate the instructional contents and this poses challenge to teachers who are not skilled in handling augmented reality resources (Ghailan and Muhammad 2019; Akçayır and Akçayır, 2017). Where there are inadequate skilled lecturers to handle augmented reality in business education, integrating such technology may not yield the desired results. Analysis of hypothesis one in table 4 shows mean ratings of responses of male and female business educators on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities. The P-value of 2.13 is greater than the alpha level of 0.05, therefore, the null hypothesis was accepted. This therefore means that there is no significant difference in the mean ratings of the responses of male and female business educators on the challenges to integration of Artificial Intelligence driven Augmented Reality into business education programmes in public universities in Ebonyi State.

Conclusion

In modern educational system, use of different technologies is gradually taking over thereby making traditional system of teaching to be obsolete. Augmented reality is one of the technologies that are contributing to the revolution in education and it's imperative to integrate such innovation in business education. This will lead to student-centered learning of interactive and immersive thereby enhancing learning experience of business education students in Public Universities. With the disruptiveness of technologies in education, integration of artificial intelligence driven augmented reality will help to position business education in global perspective and make business educators to grapple opportunities that technologies can offer. Doing this, teaching and learning will be personalized, engaging and offer students the opportunity to explore virtual environments which will lead to enhanced learning.

Recommendations

In view of the findings and conclusions, the following recommendations were made:

1. Those in heads in affairs of business education programmes in universities should make efforts to review business education curriculum to incorporate augmented learning instructional contents.
2. University management should provide funds for procurement and installation of augmented reality resources in business education laboratories as this will increase student's access to emerging technologies.
3. Business educators should be encouraged to seize the opportunities presented by artificial intelligence to upgrade their technological skills so that they will be in-tone with contemporary changes in education.

References

1. Abad-Segura E, González-Zamar MD, Luque-de la Rosa A, Morales M. Sustainability of educational technologies: an approach to augmented reality research. Sustainability; 2020:12(10). Available from: https://doi.org/10.3390/su12104091.
2. Acar A, Van De Ven AH. Artificial intelligence (AI) for decision making in the era of Big Data – evolution, challenges, and research agenda. European Journal of Operational Research. 2018;264(2):626-638.
3. Akçayır M, Akçayır G. Advantages and challenges associated with augmented reality for education: a systematic review of the literature. Educational Research Review. 2017;20:1-11. Available from: https://doi.org/10.1016/j.edurev.2016.11.002.
4. Avila-Garzon C, Bacca-Acosta J, Kinshuk J, Duarte J, Juan B. Augmented reality in education: An overview of twenty-five years of research. Contemporary Educational Technology; 2021:13(3). Available from: https://doi.org/10.30935/cedtech/10865.
5. Bersin J. Will AI replace HR? A new study from IBM says it can. Forbes; c2017. Available from:

https://www.forbes.com/sites/joshbersin/2017/03/23/will-ai-replace-hr-a-new-study-from-ibm-says-it-can.
6. Bishop J. Ethical HR: AI in hiring and the importance of maintaining human connections. *HR Dive*. 2019. Available from: https://www.hrdive.com/news/ethical-hr-ai-in-hiring-and-the-importance-of-maintaininghuman-connectio/569055/.
7. Chen Y, Wang T. Harnessing the power of AI for HR analytics: opportunities and challenges. Journal of Human Resource Management. 2019;25(3):112-130.
8. Correia A, Fonseca B, Paredes H, Martins P, Morgado L. Computer-simulated 3D virtual environments in collaborative learning and training: meta-review, refinement and roadmap. Handbook on 3D3C Platforms. Springer; 2016:403-440.
9. Dube TJ, Ince G. A novel interface for generating choreography based on augmented reality. International Journal of Human-Computer Studies. 2021;13(2):12-24.
10. Ghailan AA, Muhammad MB. Challenges analysis for using augmented reality in education: a review. International Journal of Science and Research. 2019;10(3):466-471.
11. Godoy CH. Augmented reality for education: a review. International Journal of Innovative Science and Research Technology. 2020;5(6):39-45.
12. Jayesh GS. Virtual reality and augmented reality applications: a literature review. A Journal for New Zealand Herpetology; 2023:12(2).
13. Nasser A, Lim C, Al-Samarraie H, Reem Y, Ahmed IA, Samer MS. Challenges and prospects of virtual reality and augmented reality utilization among primary school teachers: a developing country perspective. Studies in Educational Evaluation; 2020:66.
14. Nwogu MC, Diseph OP. Utilization of multiple modes of assessment strategies in business education programme in colleges of education. Nigerian Journal of Business Education. 2020;7(1):218-228.
15. Nwosu BO, Crussdale OJ, Ofulue JI. Quality assurance in business education in Nigerian universities: strategies considered effective. Nigerian Journal of Business Education. 2018;5(1):20-29.
16. Ofulue JI, Nwagwu LN, Ogbu JA. Curbing the challenges facing business teacher education in tertiary institutions. Association of Business Educators of Nigeria Conference Proceedings. 2020;7(1):771-778.
17. Ojode L, Wolde M, Claiborne J. Impacts of the Covid-19 pandemic on business education: case for the AACSB's agility standard. Southwestern Business Administration Journal. 2021;19(1):1-25.
18. Rouse M. Augmented reality; c2015. Available from: http://whatis.techtarget.com/definition/augmented-reality-AR.