APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNIQUES IN TEACHING AND LEARNING OF ENTREPRENEURSHIP STUDIES IN SECONDARY SCHOOLS IN ANAMBRA STATE

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Abstract

This study determined the application of artificial intelligence techniques in teaching and learning of entrepreneurship education in secondary schools in Anambra State. Two research questions guided the study and two null hypotheses were tested. The study adopted a descriptive survey research design using a population of 119 entrepreneurship educators in all the public secondary schools. The entire population was studied without sampling because the size was manageable. A structured questionnaire developed by the researcher was used for data collection. Cronbach Alpha method was used to establish the reliability which yielded coefficient values of 0.81 and 0.83 for the two clusters. Out of the 119 copies of the questionnaire distributed, 103 (representing 86.55%) were duly completed, retrieved and used for data analysis. Mean, standard deviation and ANOVA were used to analyze the data. The results showed that AI-driven e-learning platforms and AIbased assessment tools were applied to a low extent by entrepreneurship educators in secondary schools. The results showed that experience do not significantly influence the mean ratings of the respondents on the extent they applied AI-driven e-learning platforms and AI-based assessments tools in teaching and learning. Therefore, it was recommended among others that there is a need for comprehensive professional development programmes aimed at equipping educators with the necessary skills and competencies to effectively leverage AI tools in teaching and learning. These programmes should focus on providing training in AI literacy, data analytics, and instructional design to enable educators to create AI-enhanced learning experiences that align with curriculum objectives.

Keywords: *Artificial intelligence, entrepreneurship education, entrepreneurship educators and secondary schools.*

Introduction

Education is a major determinant that can bring about the development of any nation. Education plays a very important role in the social, political and economic development of a country as it is aimed at supplying the economy with human capital that can convert effectively and efficiently other resources into output of high value. According to Naziev (2017), education is the socially organized and regulated process of continuous transfer of socially significant experience from previous to following generations. When people are educated, their mindset are developed towards positive thinking and help them acquire physical and psycho-spiritual capabilities demanded by socio-cultural environment within which one is groomed to live and function. One major problem of education in Nigeria, as in other parts of the developing economies in unemployment.

In Nigerian situation, the efforts at solving the unemployment problems in the country resulted in the renewed interest in entrepreneurship studies (Nwangwu, 2007). According to Nwankwo, (2006) entrepreneurship study is an integral part of general education designed to equip students with entrepreneurial skills that will make them self-reliant, self-employable, creative and innovative. Entrepreneurship studies as provided in Federal Republic of Nigeria, (FRN) (2011) is taken as core subject in the secondary school

curriculum. In this study, entrepreneurship studies therefore, is an aspect of the school curriculum which should be properly managed in order to achieve the desired result of job creation in the country.

Part of the school programme of entrepreneurship studies require some managerial practices like proper planning, coordination, supervision, direction and evaluation. Things before the desired objectives could be achieved. School principals who are managers in their schools need to ensure that the entrepreneurship study is well implemented in order to achieve one of the main objectives of secondary education which is to prepare the students for useful living in society.

Entrepreneurship study is made up of all kinds of experiences that give students the ability and vision of how to access and transform opportunities of different kinds (Okoye, 2007). It goes beyond business creation to include increasing students' ability to anticipate and respond to societal changes. Thus, entrepreneurship study enables the recipient to develop the willingness and ability to explore and exploit investment opportunities, establish and manage a successful business enterprise.

The Federal Republic of Nigeria (FRN, 2013) enumerated the entrepreneurship subjects as follows: auto body repair and spray painting, auto electrical work, auto mechanical work, auto parts merchandising, air conditioning refrigerator welding and fabrication engineering craft practice, electrical installation and maintenance work. Others, according to the document include radio, TV and electrical work, block laying, brick laying and concrete work, painting and decorating, plumbing and pipe fitting, machine woodworking, carpentry and joinery, furniture making, upholstery, catering and craft practice, garment making, textile trade, dyeing and bleaching, printing craft practice. Further provisions are cosmetology, leather goods manufacturing and repair, keyboarding, short hand, data processing, store keeping, book keeping, GSM maintenance. etc., photography, tourism, mining, animal husbandry, fisheries, marketing, and salesmanship.

The Federal Ministry of Education (FME, 2000) articulated the objectives of entrepreneurship education to include:

1. Offer functional education for the youths so as to enable them to be self-employed and self-reliant.
2. Offer graduates with adequate training that will enable them to be creative and innovative in identifying novel business opportunities.
3. Provide university/college graduates with adequate training in risk management.
4. Provide the young graduates with enough training and support that will enable them to establish a career in small and medium sized businesses.
5. Offer graduates adequate training in the acquisition of skills that will enable them meet the manpower needs of the society.
6. To stimulate both individual and economic growth of rural and less developed areas.
7. Provide both small and medium business enterprises with the opportunity of recruiting graduates who will be trained and tutored in the skills relevant to the management and operation of small business centres.
8. To inculcate the spirit of perseverance in the youths and adults which will enable them to persist in any business venture they embark on.

Entrepreneurship education is a field of study and training in entrepreneurship practices and specific skills such as accounting, information processing, keyboard/typewriting techniques, secretarial studies, entrepreneurship management, marketing and record keeping (Okoro, 2017). These skills are very useful for office workers, teachers and entrepreneurs. The programme facilitates development of attitudes, knowledge and skills needed by all citizens to effectively manage personal and public entrepreneurship in an economic system. It is, therefore, considered as one of the keys that open the door for sustainable development in any country where it is effectively implemented. The programme is handled by well-trained teachers called entrepreneurship educators. Entrepreneurship educators are well trained professional teachers of entrepreneurship education who are competent in teaching all the components that make up the programme in the schools. Aliyu (2013) stated that one can be referred to as a entrepreneurship educator only when one has a basic knowledge of all the three options (programme areas) of the entrepreneurship teacher education programme. The objectives of the programme include to provide students with information about all aspects of entrepreneurship thereby including entrepreneurship ethics as part of the curriculum and to produce graduates that are equipped with skills and competencies required in modern offices and schools as well as entrepreneurship.

Association of Entrepreneurship Educators of Nigeria (ABEN) (2017) explained that the objectives include preparation of students for initial employment, upgrading existing skills and retraining in new related entrepreneurship and office occupations. Graduates of the programme are expected to possess an intelligent understanding of the various areas of work in which they can earn a living. It develops economic literacy in all citizens, promotes both the discriminating use of services and resources by consumers and corresponding understanding of the consumers' viewpoint and how best to serve them. Furthermore, it provides background preparation in entrepreneurship as well as skill and tools to cope more effectively with college demands.

However, these objectives can only be achieved if the instructional strategies are modified to suit the technological demands of modern offices, schools and the entrepreneurship environment. The world is rapidly trending technologically and this has permeated every field of human endeavour including education. As a result of this revolution, information, ideas, lifestyles and innovations easily spread to every part of the world. The nature of instructional preparations and delivery in education has also revolutionized and Entrepreneurship Education programmes are affected by these rapid changes in technology and automation. One of the new educational technologies in education is artificial intelligence.

Artificial intelligence is defined as technologies used to allow computers to perform tasks that would otherwise require human intelligence, such as virtual perception, speech recognition and language translation (Fanning, 2024). Artificial intelligence is a technology where machines can learn and understand logic like humans. This technology is said to be able to help simplify human life which is very complex (Fitria, 2021). AI itself works by combining the presence of several data, iterative processing, and intelligent algorithms. This allows the software to learn automatically from patterns or features in the data. Artificial intelligence education software development has revolutionized traditional learning methods, from mobile digital courses to online references and virtual classrooms. This advanced technology has become integral to modern educational environments, replacing traditional teaching methods. Artificial intelligence (AI) is poised to address some challenges that education deals with today, through innovation of teaching and learning processes. In its development, artificial intelligence has also penetrated the world of education. AI systems allow people to learn with the help of education assistants such as bots. The development of the times requires the world of education to adapt to technological developments to improve the quality of education, especially the adjustment of information and communication technology. By applying AI in education technologies, educators can determine student needs more precisely, keep students more engaged, improve learning, and adapt teaching accordingly to boost learning outcomes (Issayeva, 2023). Artificial intelligence in education offers personalized learning experiences, automates administrative tasks, and provides real-time data analysis.

The role of artificial intelligence in the field of education is numerous. It is included as part of curriculum, as an instructional delivery system and a tool to enhance the entire learning process (Raja and Nagasubramani, 2018). Technology has radically and positively impacted on education and training globally by

transforming teaching and learning. In fact, there is no aspect of human existence and career generally and particularly Entrepreneurship Education that has not been impacted tremendously by technology. It is expected that the wide application of artificial intelligence for teaching and learning in Entrepreneurship Education programmes in Nigerian institutions will likely impact in improving the quality and learning patterns to be more practical and effective. One of the most significant impacts of AI in education is its ability to provide individualized learning paths for students based on their unique needs, learning styles, and abilities (Takyar, 2022). This helps to ensure that students receive the support and resources they need to succeed, regardless of their background or skill level. AI in education helps educators identify gaps in student knowledge and provide targeted feedback to improve learning outcomes.

One of the biggest challenges in education is that everyone learns differently. It is difficult for teachers to accurately grasp each student's real learning situation, leading to the teaching design and teaching process, difficult to focus on each student's real learning needs, resulting in a waste of energy, time and teaching resources. But the artificial intelligence system can provide each learner with a personalized learning style, so that each student can learn in the most suitable way, accurately record the learning status of each student, assist teachers to achieve hierarchical teaching and precise teaching, and effectively solve the core problems of teaching and learning. The presence of AI-based applications provides opportunities to learn anytime and anywhere, not limited by space and time (Fitria, 2021). In addition, students also have the opportunity to find teachers other than the teachers at the school. With this online education platform and the availability of teachers to choose from, students have the opportunity to communicate with other teachers, even with teachers from other countries. The learning experience and abilities of students will certainly be able to develop better. At present, the application of artificial intelligence in the field of our education mainly includes image recognition, speech recognition, human-computer interaction and so on (Deng, Ang & Ning, 2019). Applications of artificial intelligence in this study mainly focused on AI-driven e-learning platforms and AI-based assessment tools in teaching and learning.

Artificial Intelligence (AI) is dramatically transforming the landscape of eLearning, bringing about a revolution that enhances the learning experience and operational efficiency of educational platforms (Tulsiani, 2023). By integrating AI, eLearning platforms are evolving into intelligent systems capable of delivering personalized, engaging, and adaptive learning experiences. One of the most significant contributions of AI to eLearning is the ability to provide personalized learning experiences. AI algorithms analyze vast amounts of data on individual learners' behaviours, preferences, and performance. This analysis enables the creation of customized learning paths tailored to each student's unique needs. Personalized learning is an educational approach that tailors instruction to individual students' needs, abilities, and interests. It involves adapting the content, pace, and style of teaching and learning based on each learner's unique profile. Personalized learning recognizes that one-size-fits-all instruction is often ineffective because learners have diverse backgrounds, prior knowledge, learning styles, and motivations (Katiyar, 2024). For instance, AI can identify areas where a learner is struggling and adjust the content accordingly, offering additional resources, exercises, or alternative explanations to help them grasp difficult concepts. The use of modern technology to mold students' expectations and "abilities to access, acquire, manipulate, construct, create, and communicate information" in these digital contexts has resulted in students prospering (Green & Donovan, 2018). Personalized learning platforms known as "adaptive learning systems" (ALSs) may be used to create lessons that are personalized to the learning styles and preferences of students as well as the order and level of task difficulty (Pliakos, et al., 2019).

Adaptive learning is another area where AI is making a significant impact. Traditional eLearning platforms often follow a one-size-fits-all approach, which can be inefficient for diverse learners with varying abilities and learning paces. AI-driven adaptive learning technologies dynamically adjust the difficulty and type of content presented to learners based on their ongoing performance and interaction patterns. AI's ability to analyze vast amounts of data is transforming how eLearning platforms gather and utilize insights. By tracking learners' interactions, progress, and performance, AI can generate detailed analytics that help educators and administrators understand the effectiveness of their courses and identify areas for improvement. These datadriven insights enable more informed decision-making and continuous optimization of the learning process.

AI is also enhancing learner engagement and interaction through the use of chatbots and virtual assistants. These AI-driven tools can facilitate communication between learners and the eLearning platform, answering queries, providing information, and guiding users through their learning journey. Chatbots can handle routine inquiries, such as course registration or technical issues, allowing human instructors to focus on more complex and valueadded tasks. Bordia (2023) concluded that educational institutions can use AI-powered chatbots to provide uninterrupted learning to students. As chatbots are available, students can use them to resolve doubts in real time. Moreover, chatbots can also be used by school authorities to provide information to parents and students.

Artificial intelligence streamlines the assessment and grading system by analyzing student work and offering swift and consistent evaluations. It lightens educators' burdens, allowing them to concentrate on personalized guidance (Takyar, 2022). Patterns in student performance aid in identifying struggling individuals and directing focused assistance. Meanwhile, AI's efficiency ensures prompt feedback, enhancing the learning cycle. The automated grading and assessment systems optimize teaching quality, promote equitable assessment, and cultivate effective student-teacher collaboration. AI can automate grading processes for assignments, quizzes and exams. By using machine learning algorithms, AI systems can assess and provide feedback on student work, saving time for educators and offering immediate feedback to learners. This enables teachers to focus more on personalised instruction and supports timely feedback for student growth such as suggesting corrections and identifying learners' mistakes (Memarian, 2023).

AI-based systems for assessment include services such as intelligent tutoring systems (ITS), automated scoring tools, computerised adaptive tests, essay scoring systems, chatbots, AI robots, augmented and virtual reality systems, all of which have been developed over a number of years. Teachers can use artificial intelligence (AI) tools to personalise formative assessment, providing real-time individualised feedback that addresses individual learning needs. AI can reduce the subjectivity associated with human grading and reduce the time spent on grading tasks. However, AI-powered tools can automate the process of providing feedback on assignments, quizzes, and exams, saving teachers valuable time while ensuring that students receive timely feedback to improve their performance. Students receive instant feedback on their work, allowing them to identify errors and areas for improvement in real time. This feedback loop boosts learning efficiency and facilitates student progress (Muñoz, et al., 2022). Additionally, natural language processing (NLP) technology enables AI to evaluate written assignments, essays, and even speeches, providing detailed feedback on grammar, style, and content.

Artificial intelligence powered tools and applications improve educational measurement, including testing, assessment, and evaluation. These tools can provide educators with valuable insights into student performance, learning outcomes, and instructional effectiveness. For example, AI-powered assessment tools can analyze student responses to assignments and provide personalized feedback to help students identify areas of strengths and weaknesses (Nazaretsky et al., 2022). These tools can also provide teachers with insights into the effectiveness of their instruction and identify areas, where they may need to adjust their teaching strategies. In addition, AI-powered tools can help automate many aspects of the assessment process, saving time and reducing the burden on teachers (Huang et al., 2023). AI-powered tools can also help identify students at risk of falling behind or benefit from additional assistance or remediation (Delgado et al., 2020). These tools can analyze students' data, such as test scores and attendance records, and identify patterns that may indicate a need for intervention. This can help teachers to provide targeted support to students who need it most. Therefore, the development of AI-powered tools and applications has revolutionized the field of education by providing educators with valuable insights into student performance, learning outcomes, and instructional effectiveness. Artificial intelligence application in secondary schools in Anambra State empowers entrepreneurship educators to use AI as a tool to enhance instruction (Singh & Jain 2022).

The entrepreneurship educators to be used in this study come from secondary schools with different levels of educational attainment and years of experience which may influence their level of skills in applying artificial intelligence for instructional purposes. This provides one with respondent variable years of experience (0-5 years/6-10 years/above 10 years) which will enrich the study. Experience is the number of years or the

period a worker has been performing assigned duties. The term experience is defined as professional growth that takes place in the educator as a result of continued stay, or study on the job and other related processes. The general notion according to Obasi (2016) is that employees with high level of experience perform better than those with lower experience. This conception is still a matter of great debate among researchers in education and management sciences. Teachers with more years of experience in new technologies tends to implement more innovative methodologies through emerging technologies than teachers with less years of experience (Oleksiuk and Olesiuk, 2020).

Artificial intelligence can be deployed to solve various problems hindering the effective implementation of teaching programmes in secondary schools across the country. The teaching programme is a core programme of secondary schools and is very critical to the attainment of secondary schools. Artificial intelligence is important for the academic development of communities of students and teachers, it is therefore relevant that every user of technologies be abreast to the benefits it offers especially to the education sector. Researchers in education Brown, Lewis and Harcleroad, in (Omariba, Gitau and Ayot, 2016) have shown that with present inadequate infrastructure and lack of technologically skilled teachers in education, it is difficult to intensively achieve the goals and objectives of quality education and training. It is against this background that this study on application of artificial intelligence techniques in teaching and learning of entrepreneurship education in secondary schools in Anambra State was conceived.

Statement of the Problem

The key objective of entrepreneurship education is to equip recipients with skills that will enable them to succeed in employment as teachers, workers in modern offices, or entrepreneurs in the current technologydriven entrepreneurship environments. With advancement in technology in the 21st century, artificial intelligence has become an invaluable technology for teaching, learning and research in education. AI has so many advantages on teaching and learning. However, despite these numerous advantages, some teachers still find it challenging in transiting from the analogue to the digital in teaching and learning of entrepreneurship education. Entrepreneurship educators may have a limited understanding of how the technology works and may lack the technical expertise to fully comprehend the algorithms used in AI tools and how they affect assessment outcomes. Without adequate training, educators may be unable to use the tools effectively, leading to inaccurate assessments. AI-powered tools require a stable and reliable technology infrastructure. Technical difficulties, such as power outages, internet disruptions, or software malfunctions, can disrupt the assessment process, leading to inaccurate or incomplete assessments. This appears to have been seriously affecting the students' academic performance as regards to the acquisition of appropriate skills. As a result, the morale and interest of students in entrepreneurship education is low.

Purpose of the Study

The main purpose of the study is to determine the application of artificial intelligence techniques in teaching and learning of entrepreneurship education in secondary schools in Anambra State. Specifically, the study sought to determine the application of:

1. AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools.

2. AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools.

Research Questions

The following research questions guided the study:

1. To what extent do entrepreneurship educators apply AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools?

2. To what extent do entrepreneurship educators apply AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience.

2. There is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience.

Research Method

Descriptive survey research design was adopted in this study. According to Nworgu (2015), descriptive survey research design is one which aims at collecting data and describing in a systematic manner the characteristics, features or facts about a given population using a questionnaire. The study was carried out in Anambra State. Anambra State is one of the five States that make up South-East, Nigeria. The population of the study comprised 119 entrepreneurship educators from four secondary schools offering entrepreneurship education programme. The entire population was studied without sampling because the size was manageable.

Data for the study were collected using a structured questionnaire titled "Extent of Application of Artificial Intelligence Techniques Questionnaire (EAAITQ)". The respondents were requested to rate the items on a 5point rating scale of very high extent (VHE), high extent (HE), moderate extent (ME), low extent (LE) and very low extent (VLE) with values 5, 4, 3, 2 and 1 respectively. The instrument was validated by three experts in entrepreneurship education. Cronbach Alpha method was used to establish the reliability of the instrument. The reliability test yielded coefficient values of 0.81 and 0.83 for the two clusters. Out of the 119 copies of the questionnaire distributed, 101 (representing 84.87 %) were duly completed, retrieved and used for data analysis. Data collected were analyzed using mean, standard deviation and ANOVA. The application of Statistical Package for Social Sciences (SPSS) version 23 was used for data analysis. For the hypotheses, p-value was used for decision making. Where the calculated p-value was less than the stipulated level of significance 0.05 (i.e. p

< 0.05), it implies that there was a significant difference between respondents' mean scores and the null hypothesis was rejected. On the other hand, if the p-value was greater than or equal to the alpha level of 0.05 (p

≥ 0.05), it meant that there was no significant difference in the respondents mean scores and was not rejected.

Results

Research Question 1: To what extent do entrepreneurship educators apply AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools?

Table 1: Mean ratings of entrepreneurship educators on their extent of application of AI-driven elearning platforms ; N = 103

S/No	AI-driven e-learning platforms	Mean	SD	Decision
1.	**Identifying areas the students need additional support**	2.08	0.65	Low extent
2.	**Identifying patterns and trends in learner behaviour**	1.92	0.66	Low extent
3.	**Optimized learning paths and objects**	1.70	0.72	Low extent

4. Providing real-time assistance through chatbots	1.77	0.59	Low extent
5. Developing innovative solutions to complex problems	2.00	0.74	Low extent
6. Improves personalization through targeted learning material delivery	2.09	0.70	Low extent
7. Identification of learning styles for improved academic predictions	1.99	0.70	Low extent
8. Data-driven insights and analytics	1.86	0.74	Low extent
9. Exposure to diverse perspectives and ideas	1.89	0.68	Low extent
10. Content accessibility	1.90	0.75	Low extent
Cluster Mean	**1.92**		**Low extent**

Table 1 shows that the mean scores of all the 10 items on AI-driven e-learning platforms ranging between 1.70 and 2.09 which indicate that each of them is applied to a low extent. The cluster means score of 1.92 shows that, and whole AI-driven e-learning platforms are applied to a low extent by entrepreneurship educators in secondary schools in Anambra State Nigeria. The standard deviations for all items are within the same range showing that there is homogeneity amongst responses indicating a greater consensus of opinion.

Research Question 2: To what extent do entrepreneurship educators apply AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools?

Table 2: Mean ratings of entrepreneurship educators on their extent of application of AI-based assessment tools; N = 103

S/No	AI-based assessment tools	Mean	SD	Decision
11.	**Intelligent tutoring systems**	2.09	0.73	Low extent
12.	**Essay scoring systems in identifying struggling individual**	2.14	0.69	Low extent
13.	**Automated scoring tools in promoting equitable assessment**	2.71	0.53	Moderate extent
14.	**Virtual reality systems in predicting future learning trends**	2.60	0.61	Moderate extent
15.	**AI robots in creating exercises and quizzes**	3.03	0.49	Moderate extent
16.	**Automated scoring tools in generating text**	2.08	0.70	Low extent
17.	**Computerized adaptive tests in identifying areas for intervention**	1.84	0.75	Low extent
18.	**Differentiating instruction effectively**	2.88	0.33	Moderate extent
19.	**Chat bots in accessing critical thinking skills**	2.86	0.36	Moderate extent
20.	**Facilitating data sharing across platforms**	1.95	0.66	Low extent
Cluster Mean		**2.42**		**Low extent**

As displayed in Table 2, the cluster mean of 2.42 shows that entrepreneurship educators applied AIbased assessment tools to a moderate extent in teaching and learning of entrepreneurship education in secondary schools in Anambra State, The item-by-item analysis shows that items 11, 12, 16, 17 and 20 with mean scores of 1.84 to 2.14 are AI-based assessment tools applied to a low extent, while items 13, 14, 15, 18 and 19 with the mean scores of 2.71, 2.60, 3.03, 2.88 and 2.86 respectively are AI-based assessment tools applied to a moderate extent by entrepreneurship educators. The standard deviations of 0.33 to 0.75 are within the same range, showing homogeneity in responses.

Hypotheses Testing

Hypothesis 1: There is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience.

Table 3: Summary of ANOVA on the AI-driven e-learning platforms applied by entrepreneurship educators in teaching and learning

Source of Variance	Sum of Square	df	Mean Square	F	P-value	Decision
Between Groups	13.502	2	6.751	1.465	.234	Not Sig
Within Groups	875.617	100	4.609			
Total	889.119	102				

Table 3 shows that at 100 degree of freedom, experience does not significantly influence the mean ratings of respondents on the extent of their application of AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools in Anambra State. F-ratio is 1.465 and P-value (.234) which is greater than the stipulated 0.05 level of significance (P-value > alpha level). Therefore, the null hypothesis is not rejected.

Hypothesis 2: There is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience.

Table 4: Summary of ANOVA on the AI-based assessment tools applied by entrepreneurship educators in teaching and learning

Source of Variance	Sum of Square	df	Mean Square	F	P-value	Decision
Between Groups	4.807	2	2.403	.878	.417	Not Sig
Within Groups	560.866	100	2.736			
Total	565.673	102				

Table 4 shows that at 100 degree of freedom, experience do not significantly influenced the mean ratings of the respondents on the extent of their application of AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools in Anambra State. F-ratio is .878 and *P-value* (.417) is greater than the stipulated 0.05 level of significance (P-value > alpha level). Therefore, the null hypothesis is not rejected.

Discussion of Findings

Results of the study indicated that AI-driven e-learning platforms are applied to a low extent by entrepreneurship educators in teaching and learning of entrepreneurship education in secondary schools in Anambra State. This implies that one of the primary concerns relates to the digital divide and disparities in access to AI technologies among students and educators, particularly in resource constrained settings. This finding is in consonance with that of Surugiu et al. (2024) who revealed that there are limited educators' and learners' knowledge and practice regarding AI in entrepreneurship education. Khoalenyane and Ajani (2024)

stated that AI adoption in secondary schools has garnered significant attention for its potential to transform various sectors, including education. Several studies highlighted the potential benefits of AI in enhancing teaching and learning experiences in higher education. For example, research by Smith and Jones (2020) demonstrated how AI-driven adaptive learning platforms can personalize educational content and provide targeted support to students, leading to improved learning outcomes. Similarly, a study by Patel et al. (2019) underscored the role of AI-powered virtual assistants in facilitating student engagement and academic support services, thereby contributing to a more inclusive and supportive learning environment. These findings align with global trends indicating the transformative potential of AI in higher education (Altbach et al., 2019). Testing of the first hypothesis revealed that there is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-driven e-learning platforms in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience. It followed, therefore, that the null hypothesis of no significant difference is not rejected.

Results of the study further revealed that AI-based assessment tools are applied to a low extent by entrepreneurship educators in teaching and learning of entrepreneurship education in secondary schools in Anambra State. In view of the findings, Gardner et al (2023) stated that technology has changed and improved access to data but some educators approach to classroom assessment has not changed. Memarian (2023) stated that data analysis can provide valuable insights into student learning patterns, identify areas for intervention, and help educators make data-driven decisions to improve teaching strategies and curriculum design. In addition to that, it can also help in automated grading under assessment. Fatria (2021) found that AI tool is widely used by professors/lecturers to publish notes, homework, quizzes, and tests that allow students to ask questions and assignments for the assessment process. Applications are widely used by professors/lecturers to publish notes, homework, quizzes, and tests that allow students to ask questions and assignments. Applications can also be used for assessment. This application can identify the reasons behind students' misunderstanding and can offer solutions that have been released by the lecturer and programmed beforehand. Testing of the second hypothesis indicated that there is no significant difference in the mean rating of entrepreneurship educators on the extent of application of AI-based assessment tools in teaching and learning of entrepreneurship education in secondary schools in Anambra State based on years of experience. Therefore, the null hypothesis of no significant difference is not rejected

Conclusion

It is clear from the study that AI-driven e-learning platforms and AI-based assessment tools have not been fully applied by entrepreneurship educators in teaching and learning of entrepreneurship education in secondary schools in Anambra State. Therefore, it is concluded that the management of secondary schools should design and develop artificial intelligence technology that could be used more in the education field in the future. This new technology assists lecturers and students to better utilize technology in teaching and learning environments, reduces lecturer's workload, makes learning easier as it happens anytime regardless of the time and place where both parties will be, and improves the lecturers' teaching methods.

Recommendations

The following recommendations are made:

1. There is a need for comprehensive professional development programmes aimed at equipping educators with the necessary skills and competencies to effectively leverage AI tools in teaching and learning. These programmes should focus on providing training in AI literacy, data analytics, and instructional design to enable educators to create AI-enhanced learning experiences that align with curriculum objectives.
2. Ongoing support and mentorship should be provided to educators to facilitate their continuous learning and adaptation to emerging AI technologies.
3. The educational institutions should prioritize investment in AI infrastructure and resources to create a conducive environment for innovation and experimentation. This includes establishing AI labs or centres

of excellence where researchers and educators can collaborate on developing and testing AI-driven solutions for teaching, assessment, and student support.

4. Moreover, institutions should foster partnerships with industry and government agencies to access funding and expertise for AI initiatives and promote knowledge exchange and technology transfer.

References

Aliyu, M. M. (2013). *Subject method for entrepreneurship teachers.* Kaduna: Sunjo A.J. Global Limited.

Association of Entrepreneurship Educators of Nigeria (2017). *Mandate of entrepreneurship education in Nigeria.* Ilorin: Integrity Publication.

Auwal, S. M. (2015). Entrepreneurship education as a tool for reducing incessant strike in Nigeria colleges of education. *Nigeria Journal of Entrepreneurship Education, 2*(3), 133- 143.

Bordia, D. (2023). How is AI used in education and academics? Retrieved June 22, 2023 from https://blog.teachmint.com/how-is-ai-used-in-education-academics

Delgado, H. O. K., de Azevedo Fay, A., Sebastiany, M. J., & Silva, A. D. C. (2020). Artificial intelligence adaptive learning tools. *BELT-Brazilian English Language Teaching Journal, 11*(2), e38749-e38749. https://doi.org/10.15448/2178-3640.2020.2.38749

Deng, L., Ang, C., Ning, S. (2019). Analysis of the current situation and situation of artificial intelligence education development. *Inf. Commun. Technol. Policy* (2019)

Federal Republic of Nigeria (FRN, 2011). The new senior secondary school curriculum structure at a glance. Lagos: NERDC

Federal Ministry of Education (FME, 2000). The conditions for effective take-off of the new senior secondary school curriculum. Lagos: NERDC

Fanning, J. (2024). AI based assessment in education (AIBA): evidence review. *james.fanning@educationscotland.gov.scot*

Fitria, T. N. (2021). *Artificial intelligence in education: Using AI tools for teaching and learning process.* Proceeding Seminar Nasional, Senin, 20, 134-147

Fitria, T. N. (2021). Grammarly as AI-powered English Writing Assistant: Students' Alternative for Writing English. *Metathesis: Journal of English Language, Literature, and Teaching*, *5*(1), 65–78. https://doi.org/10.31002/metathesis.v5i1.3519

Fitria, T. N. (2021). QuillBot as an online tool: Students' alternative in paraphrasing and rewriting of English writing. *Englisia: Journal of Language, Education, and Humanities*, *9*(1), 183–196. https://doi.org/10.22373/ej.v9i1.10233

Gardner, J., O'Leary, M., & Yuan, L. (2021). Artificial intelligence in educational assessment: Breakthrough? Or buncombe and ballyhoo?' *Journal of Computer Assisted Learning, 37*(5), 1207–1216.

Issayeva, L. (2023). AI in education. ATP Conference in Dallas, TX.

Katiyar, N., Awasthi, V. K., Pratap, R., Mishra, N., Shukla, N., Singh, R., & Tiwari, M. (2024), Ai-driven personalized learning systems: Enhancing educational effectiveness *Educational Administration: Theory And Practice*, *30*(5), 11514-11524 Doi: 10.53555/kuey.v30i5.4961

Khoalenyane, N. B., & Ajani, O. A. (2024). A systematic review of artificial intelligence in higher education South Africa. *Social Sciences and Education Research Review, 11*(1), 17-26.

Memarian, B., & Doleck, T. (2023). A review of assessment for learning with artificial intelligence. 2. A review of assessment for learning with artificial intelligence – *ScienceDirect*

Muñoz, J.L.R., Ojeda, F.M., Jurado, D.L.A., Peña, P.F.P., Carranza, C.P.M., Berríos, H.Q., Molina, S.U., Farfan, A.R.M., Arias-Gonzáles, J.J. and Vasquez-Pauca, M.J., 2022. Systematic review of adaptive learning technology for learning in higher education. *Eurasian Journal of Educational Research*, [ejournal] 98(98), pp. 221-233. https://doi.org/10.14689/ejer.2022.98.014.

Nazaretsky, T., Ariely, M., Cukurova, M., & Alexandron, G. (2022). Teachers' trust in AI-powered educational technology and a professional development program to improve it. *British Journal of Educational Technology, 53*(4), 914-931. https://doi.org/10.1111/bjet.13232

Naziev A. (2017). The future of education. *International Conference. Ryazan State University, Ryazan, Russian Federation, a.naziev@rsu.edu.ru*

Nwangwu, N.A. (2007). *Educational and the law in Nigeria: The rights of teachers and students. Owerri*: Kay Bee Cee Publication Ltd.

Nwankwo, I.N. (2006). Planning for human resources development and utilization in management and supervision of U.B.E. in Ebonyi State. Being a paper presented at the 2nd National Conference, 2006, Department of Education Foundations., ESUT, Enugu State, 24th -27th Oct., 2006.

Nwazor, J. C. (2014). Entrepreneurship education curriculum and new technologies: guidelines for review. *Nigerian Journal of Entrepreneurship Education, 1*(3), 19-29.

Nworgu, B. G. (2015). *Educational research: Basic issues and methodology.* Owerri: Wisdom publishers.

Obasi, N. F. (2016). *A study on factors influencing the administrative effectiveness of secondary school principals in Port Harcourt Metropolis.* Unpublished M.Ed Thesis, Department of Educational Management, University of Port Harcourt.

Okoro, J. (2017*).* Entrepreneurship education lecturers' acuity of strategies for improving teaching and learning of technical vocational education and training in Universities in South-East Nigeria. *ATBU, Journal of Science, Technology & Education (JOSTE);5* (3).

Okoye, K.R.E. (2007). Needs for entrepreneurship curricular in technical and vocational education programs. *Journal of Educational Research and Policies* 2(2) 46-47.

Oleksiuk, V. and Oleksiuk, O. (2020). Methodology of teaching cloud technologies to future computer science teachers. CEUR Workshop Proceedings, 2643:592–608.

Omariba, A., Gitau, E. N., & Ayot, H. O. (2016). Challenges facing teachers and students in the use of instructional technologies: A case of selected secondary schools in Kisii Central District, Kiisi County. *International Journal of Information Research and Review, 3*(11), 3329 – 3137.

Pliakos, K.; Joo, S.-H.; Park, J.Y.; Cornillie, F.; Vens, C.; Van den Noortgate, W. Integrating machine learning into item response theory for addressing the cold start problem in Adaptive Learning Systems. *Comput. Educ.* **2019**, *137*, 91–103.

Raja, R. and Nagasubramani, P. C. (2018), Impact of modern technology in education. *Journal of Applied and Advanced Research, 3*(1), 533-535.

Singh, S., & Jain, P. (2022). Applications of artificial intelligence for the development of sustainable agriculture. In: Kumar, P., Tomar, R. S., Bhat, J. A., Dobriyal, M., Rani, M. (eds) *Agro-biodiversity and Agriecosystem Management*. Springer. https://doi.org/10.1007/978-981-19-0928-3_16

Surugiu, C., Grădinaru, C., & Surugiu, M. (2024) : Artificial intelligence in entrepreneurship education: Benefits and tools, *Amfiteatru Economic Journal,* ISSN 2247-9104, T*he Bucharest University of Economic Studies, Bucharest, 26*(65), 41-258, https://doi.org/10.24818/EA/2024/65/241

Takyar, A. (2022). AI in education: Use cases, benefits, solution and implementation. LeewayHertz's Developers. The Learning Lab

Tulsiani, R. (2023). The role of artificial intelligence in revolutionizing e-learning platforms. *Strategic Learning and Development Innovator*.