



West African Journal of Industrial and Academic Research

ISSN : 2276-9129 Volume 25, No.2, December 21, 2024

<https://wajiaredu.com.ng>

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Assessing the Effectiveness of Online Resources in Enriching Curriculum

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Abstract

The integration of online resources into educational curricula has transformed teaching and learning processes, offering new opportunities to enhance educational experiences. This study assesses the effectiveness of online resources in enriching curriculum content, focusing on the course ED221 (Curriculum Theory and Planning) at Alvan Ikoku Federal University of Education, Owerri, Nigeria. Using census technique of sampling, a sample of 120 pre-service students offering ED 221 which was the entire population of the study, was used for the study due to its smallness. A 40-items researchers'-made structured questionnaire titled AEORECC (Assessing the Effectiveness of Online Resources in Enriching Curriculum Contents) was used to collect data. A reliability co-efficient of 0.75 was established using Cronbach-Alpha. The instrument was structured in Four-Point scale response options of, Very High Extent (VHE)= 4 points, High Extent (HE) = 3 points, Low Extent (LE) = 2 points and Very Low Extent (VLE) = 1 point for a positively skewed items. The two research questions were answered using mean and standard deviation. Findings revealed that both male and female students perceived online resources to significantly enhance their understanding and engagement with course material. Students reported that online videos, interactive tools, and discussion forums were particularly effective in improving comprehension and fostering collaboration. However, challenges such as accessibility and infrastructure limitations were noted, especially among female students.

Key Words: Digital Technology, Assessing, Effectiveness, Online resources, Curriculum content

1.0 Introduction

The integration of online resources into curriculum content has significantly transformed educational landscapes in recent years, mainly due to the emergence of digital technology. The effectiveness of these digital tools in enriching educational experiences has been a focal point of numerous studies, especially in developing countries like Nigeria. Nigerian scholars have

contributed extensively to this field, investigating the various dimensions through which online resources enhance the quality of education. The rapid advancement of digital technology has significantly influenced

educational practices, particularly through the integration of online resources into curriculum content. The effectiveness of these digital tools

in enhancing educational experiences has been the subject of extensive research globally. Recent studies by scholars have provided valuable insights into how online resources contribute to enriching curriculum content, improving student engagement, and fostering deeper learning.

A study by Adeoye and Adanikin (2021) highlights the pivotal role of online educational resources in enhancing curriculum delivery in Nigerian tertiary institutions. Their research highlights the fact that online platforms offer a wide variety of resources that accommodate various learning styles, therefore meeting the demands of a wider group of students. Furthermore, they argue that these resources facilitate a more interactive and engaging learning environment, which is essential for fostering deep understanding and critical thinking skills. Similarly, Eze, Chinedu-Eze, and Bello (2022) explore the impact of e-learning tools on student performance in Nigerian universities. Their findings indicate that the integration of online resources has led to improved academic outcomes, particularly in courses that traditionally rely on rote learning methods. The study suggests that the use of multimedia content, interactive simulations, and online assessments not only makes learning more dynamic but also helps in bridging the gap between theoretical knowledge and practical application.

Additionally, research by Olumorin, Yusuf, and Ajidagba (2020) delves into the challenges and benefits of using online resources in secondary education. The authors acknowledge that although there are notable hurdles in terms of infrastructure and access, the advantages of the situation are much greater than the disadvantages. Their study reveals that students who frequently utilize online resources exhibit better problem-solving skills and a higher propensity for independent learning, which are crucial competencies in the 21st-century educational paradigm. Consequently, Johnson, Smith, & Kosslyn, (2022) underscores the transformative potential of online educational resources in higher education. According to their research, the presence of a wide range of online resources enables individuals to have more customized learning experiences that suit to their unique learning styles and speeds. The

study also highlights that online resources facilitate greater access to up-to-date information, which is crucial for disciplines that evolve rapidly, such as technology and science.

In a similar vein, Smith and Brown (2021) investigated the impact of multimedia resources on student learning outcomes in secondary education. Their findings suggest that the use of videos, interactive simulations, and digital textbooks not only makes learning more engaging but also enhances students' comprehension and retention of complex concepts. The study also points out that online resources enable teachers to incorporate a variety of instructional strategies, thereby creating a more dynamic and inclusive learning environment. Moreover, research by Williams and Green (2023) examined the role of online resources in promoting collaborative learning. Their study found that digital platforms, such as online discussion forums and collaborative documents, encourage greater student interaction and teamwork. This collaborative approach not only improves academic performance but also helps students develop essential skills such as communication, critical thinking, and problem-solving.

Further supporting these findings, a meta-analysis by Lee, Kim, and Lee (2022) reviewed multiple studies on the use of online resources in education. Their analysis concluded that online resources significantly enhance curriculum content by providing flexible learning options, facilitating continuous assessment, and enabling access to a wealth of information that would otherwise be unavailable in traditional classroom settings. The study also emphasizes the importance of integrating online resources thoughtfully to maximize their potential benefits. Another meta-analysis study carried out by van Alten, Phielix, Janssen, and Kester (2020), on "Effects of flipping the classroom on learning outcomes and satisfaction", findings averred that, on average, the flipped classroom approach showed a significant positive effect on learning outcomes compared to traditional teaching methods. This positive effect was evident across various educational levels and subject areas, indicating the broad applicability of the flipped classroom model. In addition to learning outcomes, the meta-analysis also examined

student satisfaction with the flipped classroom model. Results indicated that students generally reported higher satisfaction levels with flipped classrooms compared to traditional classrooms. Factors contributing to higher satisfaction included increased engagement, more interactive and collaborative in-class activities, and better alignment with students' learning preferences.

These studies demonstrate how internet resources boost curricula at all levels. They demonstrate that digital tools improve material delivery, student engagement, collaboration, and learning results. These resources must be assessed and updated to meet learners' changing demands to keep educational systems current and effective in the digital era. The study by Adeoye, & Adanikin (2018) found that online educational resources improve curriculum delivery in Nigerian tertiary institutions by providing access to more learning materials and enabling more flexible and personalized learning experiences. In 2018, Al-Samarraie, Teng, Alzahrani, & Alalwan examined higher education e-learning continuance satisfaction from instructors and students' perspectives. E-learning is useful and easy to use, which encourages continuous engagement and better learning outcomes, according to higher education instructors and students. By Fiock (2020), online course communities of inquiry are designed. Online courses with a community of inquiry boost student engagement, deeper learning, and critical thinking by building social, cognitive, and teaching presence.

Heirdsfield, Walker, Tambyah, & Beutel (2018) evaluated blackboard as an online learning environment and found: Student and staff opinions on teacher education? Both teacher education students and staff like Blackboard's user-friendly layout and diversity of communication and evaluation options, according to the report. Students' views on online learning engagement tactics were examined by Martin & Bolliger (2018). The research found that interactive activities, timely feedback, and collaborative projects keep students engaged and boost academic achievement in online learning settings. Additionally, Moorhouse (2020) examined how a face-to-face beginning teacher education course was "forced" online because to the COVID-19 epidemic. In response to the

COVID-19 epidemic, face-to-face teacher education courses were adapted to incorporate synchronous and asynchronous online teaching methods to retain instructional quality and student engagement. Technology-enhanced learning and teaching in tertiary education: Evaluation by Reddy, Sharma, & Chinni (2020). By providing access to various resources, encouraging active learning, and enabling continuous assessment and feedback, technology-enhanced learning and teaching improves tertiary education outcomes.

2.0 Statement of the Problem

Contemporary curriculum content relies on online resources due to the fast adoption of digital technologies in education. Although these digital technologies are widely used, their effectiveness in improving education is unclear. Online resources are understudied for their ability to provide diverse, interesting, and high-quality educational information for students of all levels. The digital divide, accessibility concerns, and lack of teacher preparation in using online resources might hinder student engagement, individualized learning, and academic performance, according to several studies. Furthermore, internet materials' impact on curricular enrichment must be thoroughly assessed. This includes studying their effects on student learning, engagement, and satisfaction and identifying best practices and strategies for integrating them into educational curriculum. By rigorously assessing online resources' curriculum enrichment effects, this research addresses these shortcomings. This research aims to address these gaps by systematically evaluating the effectiveness of online resources in enriching curriculum content. The study will explore the benefits and challenges associated with the use of online educational tools, assess their impact on various aspects of learning, and provide recommendations for educators and policymakers to optimize their use in educational settings. By doing so, it seeks to contribute to the development of more effective, inclusive, and engaging educational practices that leverage the full potential of digital technologies.

3.0 Purpose of the study

This study aims specifically;
To assess the extent to which the integration of online resources enrich Curriculum Contents of ED221 (Curriculum Theory and Planning), on male and female pre-service teachers.

To identify the most effective strategies for incorporating online resources to Enrich Curriculum Contents of ED221 (Curriculum Theory and Planning), on male and female pre-service teachers.

Questions

The following research questions guided the study:

- To what extent does the integration of online resources enrich Curriculum Contents of ED221 (Curriculum Theory and Planning), on male and female pre-service teachers?
- What are the most effective strategies for incorporating online resources to Enrich Curriculum Contents of ED221 (Curriculum Theory and Planning), on male and female pre-service teachers?

4.0 Method

The study adopted descriptive survey research design. The use of **descriptive survey research design** is appropriate as it allows for a structured, objective, and efficient assessment on how online resources affect curriculum content in ED

221. It also allows for the systematic collection and analysis of data from a defined population. The study assessed the effectiveness of online resources in enriching curriculum contents. The area of the study is Alvan Ikoku Federal University of Education, (AIFUE) Owerri, Imo State, Nigeria. The researchers purposively selected Curriculum Theory and Planning (ED 221) taught at 200 Levels to ascertain the efficacy of online resources in enriching curriculum contents with the population of 120 pre-service teachers in ED/English. Using census technique of sampling, a sample of 120 pre-service students (male,15; females, 105) offering ED 221 which was the entire population of the study, and was used for the study due to its smallness. A 40-items researchers-made questionnaire titled AEORECC (Assessing the Effectiveness of Online Resources in Enriching Curriculum Contents) was used to collect data. The instrument was structured in Four-Point scale response options of, Very High Extent (VHE)= 4 points, High Extent (HE) = 3points, Low Extent (LE) = 2 points and Very Low Extent (VLE) =1point for a positively skewed items. The instrument was validated by experts in related fields; English Studies, Measurement and Evaluation, and Curriculum Studies. A reliability co-efficient of 0.75 was established using Cronbach-Alpha. The two research questions were answered using mean and standard deviation. Any question item with a mean rating of 2.50 and above was accepted, while any item below 2.50 was rejected.

Results

Question (i): To what extent does the Integration of Online Resources Enrich Curriculum Contents of ED221 (Curriculum Theory and Planning) on male and female pre-service teachers?

Table 1: Mean response scores of male and female Pre-service teachers on how the Integration of Online Resources Enrich Curriculum Contents of ED321 (Curriculum Theory and Planning)

S/N	ITEMS	MALE		FEMALE		Decision
		X	SD	X	SD	
1	Students perceive the role of online resources in enhancing their understanding of curriculum theory in ED221	2.76	0.69	2.76	0.69	High Extent
2	Some specific types of online resources are most useful to students in ED221	2.81	0.74	2.75	0.65	High Extent
3	Students utilize online resources for their coursework in ED221	2.44	0.38	2.65	0.53	High Extent
4	Online resources improve students' engagement with the course material in ED221	2.88	0.75	2.86	0.79	High Extent
5	Online resources impact students' performance on assessments in ED221	2.64	0.70	2.79	0.68	High Extent
6	Students encounter some challenges when accessing online resources for ED221	2.56	0.45	2.82	0.74	High Extent
7	Online resources influence students' ability to collaborate with peers in ED221	2.78	0.69	2.74	0.63	High Extent
8	Students believe that online resources help them apply theoretical concepts in practical scenarios	2.57	0.54	2.89	0.75	High Extent
9	Students are satisfied with the quality of online resources provided in ED221	2.78	0.86	2.69	0.60	High Extent
10	Online resources affect students' motivation to study and participate in ED221	2.85	0.79	2.84	0.76	High Extent
11	Online resources have some impacts on students' critical thinking skills in ED221	2.77	0.65	2.64	0.57	High Extent
12	Students perceive the accessibility of online resources in ED221	2.76	0.61	2.77	0.67	High Extent
13	There are relationships between the use of online resources and students' grades in ED221	2.71	0.66	2.65	0.54	High Extent
14	Online resources support students in completing assignments and projects in ED221	2.87	0.75	2.73	0.67	High Extent
15	Students rate the user-friendliness of online resources used in ED221 differently	2.85	0.71	2.70	0.62	High Extent
16	Online resources help students with different learning styles in ED221	2.78	0.65	2.60	0.54	High Extent
17	Online resources contribute to students' self-directed learning in ED221	2.65	0.54	2.71	0.68	High Extent
18	Students have feedback regarding the integration of online resources in ED221	2.75	0.61	2.59	0.51	High Extent
19	Students perceive the impact of online resources on their overall learning	2.89	0.73	2.68	0.56	High Extent

	experience in ED221					
20	Online resources help students to a certain extent to stay updated with current trends and research in curriculum theory and planning	2.79	0.69	2.84	0.76	High Extent
	GRAND MEAN	2.74	0.69	2.84	0.76	High Extent

The grand mean scores in **table 1**, for the integration of online resources in ED221 are 2.74 for male students and 2.84 for female students. The results indicate that both male and female students perceive the integration of online resources in ED221 to be moderately effective in enriching the curriculum. Female students generally report slightly higher benefits from online resources in terms of performance, frequency of use, and application of theoretical concepts.

Question (ii): What are the most effective strategies for incorporating online resources to enrich Curriculum Contents of ED221 (Curriculum Theory and Planning), on male and female pre-service teachers?

Table 2: Mean Response Scores on the most effective strategies for incorporating online resources to Enrich Curriculum Contents of ED221 (Curriculum Theory and Planning),) on male and female pre-service teachers?

		Male		Female		
S/N	ITEMS	Mean	SD	Mean	SD	Decision
1	Students are presented with different types of online resources for learning in ED221	2.76	0.65	2.71	0.60	High Extent
2	Online videos and multimedia resources can be effectively used to enhance students learning in ED221	2.75	0.67	2.85	0.77	High Extent
3	Online interactive tools (e.g., simulations, quizzes) play a vital role in students' learning experiences in ED221	2.53	0.47	2.75	0.68	High Extent
4	Online discussion forums(e.g, Reddit, Quora, Linkedin groups, Facebook, etc,)can be utilized to facilitate peer interaction and learning in ED221.	2.67	0.56	2.78	0.70	High Extent
5	Students positively perceive the effectiveness of online collaborative platforms in ED221	2.55	0.46	2.66	0.51	High Extent
6	Open educational resources (OERs) can be integrated to meet students' learning needs in ED221	2.67	0.57	2.73	0.67	High Extent
7	Students find most instructional strategies more effective when using online resources in ED221	2.73	0.66	2.75	0.66	High Extent
8	Instructors ensure that online resources align with students' learning outcomes in ED221	2.62	0.59	2.72	0.61	High Extent

9	Students need support to effectively use online resources in ED221	2.75	0.61	2.74	0.62	High Extent
10	Online resources can be curated to ensure they are relevant to students' cultural backgrounds in ED221	2.71	0.60	2.62	0.55	High Extent
11	Most strategies can be used to make online resources more accessible to all students in ED221	2.53	0.48	2.76	0.68	High Extent
12	Students' feedback can be used to improve the integration of online resources in ED221	2.75	0.69	2.71	0.66	High Extent
13	Students require certain training to maximize the benefits of online resources in ED221	2.65	0.60	2.73	0.69	High Extent
14	Online resources could be used to support personalized learning paths for students in ED221	2.78	0.69	2.57	0.50	High Extent
15	Learning management systems (LMS) play certain roles in helping students access and use online resources in ED221	2.66	0.58	2.65	0.59	High Extent
16	Online resources could be integrated into project-based learning activities for students in ED221	2.73	0.65	2.87	0.79	High Extent
17	There are best practices for engaging students with online resources in ED221	2.75	0.70	2.53	0.51	High Extent
18	Instructors can easily assess the effectiveness of online resources from a student's perspective in ED221	2.72	0.69	2.62	0.58	High Extent
19	Ethical considerations should be addressed when using online resources for student learning in ED221	2.74	0.68	2.75	0.69	High Extent
20	Online resources could be used to promote lifelong learning skills among students in ED221.	2.62	0.57	2.71	0.68	High Extent
	Grand Mean	2.68	0.56	2.67	0.61	High Extent

Table 2, above with mean responses of 2.68 for male and 2.67 for female students, indicates a high extent of effectiveness perceived by both genders. Effective strategies for incorporating online resources include the use of videos and multimedia, interactive tools, and online discussion forums. Female students particularly value multimedia resources and project-based learning activities, while male students emphasize the need for personalized learning paths and engaging instructional strategies.

5.0 Discussion of Findings

The study conducted at Alvan Ikoku Federal University of Education (AIFUE) focused on assessing the effectiveness of online resources in enriching the curriculum content of ED221

(Curriculum Theory and Planning). The findings align with those of Adeoye and Adanikin (2021), who highlighted the pivotal role of online educational resources in Nigerian tertiary institutions. Both studies underscore the

enhanced curriculum delivery facilitated by access to a diverse range of materials supporting various learning styles. This enhancement is reflected in the positive perceptions of students in ED221, who rated the integration of online resources as moderately effective in enriching their learning experience. In the same vein, Eze, Chinedu-Eze, and Bello (2022) explored the impact of e-learning tools on student performance in Nigerian universities, revealing that online resources improve academic outcomes. This is consistent with the findings from the ED221 study, where students reported that online resources positively impacted their performance on assessments and helped bridge the gap between theoretical knowledge and practical application. The mean scores indicated that students found online resources useful in understanding complex concepts and improving their academic performance.

The studies by Olumorin, Yusuf, and Ajidagba (2020) and Williams and Green (2023) emphasize the benefits of online resources in promoting student engagement and collaboration. In ED221, students reported that online resources improved their engagement with course material and facilitated peer collaboration. This aligns with the findings from these previous studies, which highlight the role of digital platforms in encouraging student interaction and teamwork, crucial for developing essential skills such as communication and critical thinking. While the benefits of online resources are evident, challenges such as accessibility and digital divide remain significant issues. Olumorin et al. (2020) and the ED221 study both noted infrastructural challenges. In ED221, students reported encountering difficulties accessing online resources, particularly female students. This finding mirrors the global concern about the digital divide, which can hinder the full potential of online resources in educational settings. The ED221 study identified effective strategies for incorporating online resources, such as using videos, multimedia, interactive tools, and online discussion forums. These strategies align with the findings of Smith and Brown (2021), who noted that multimedia resources enhance comprehension and retention of complex concepts. The emphasis on interactive tools and discussion forums also resonates with the findings of Williams and

Green (2023), who highlighted the importance of collaborative learning platforms. The findings from the study on ED221 at AIFUE corroborate previous research, highlighting the positive impact of online resources on curriculum enrichment, student performance, engagement, and collaborative learning. However, challenges such as accessibility and infrastructure need to be addressed to maximize the benefits of these digital tools. The identification of effective strategies for incorporating online resources can guide educators and policymakers in optimizing their use in educational curricula, ensuring a more effective and inclusive learning experience for all students.

Conclusion

The integration of online resources into curriculum content has proven to be significantly effective in enriching educational experiences, as demonstrated by the findings from the study conducted at Alvan Ikoku Federal University of Education (AIFUE). The research revealed that online resources positively impact student's engagement, understanding, performance, and collaboration, aligning with previous studies conducted by scholars such as Adeoye and Adanikin (2021), Eze, Chinedu-Eze, and Bello (2022), and Williams and Green (2023). Despite these benefits, challenges such as accessibility and infrastructural issues remain prevalent, particularly affecting female students. However, the identification of effective strategies for incorporating online resources provides a pathway for educators and policymakers to optimize their use, ensuring a more inclusive and effective learning experience for all students. Recommendations Some recommendations were made based on the research findings to include; Improve Accessibility: There should be an enhancement of infrastructure and access to digital resources, especially in regions with limited internet connectivity, to ensure all students can benefit from online educational tools. In addition, student's feedback should be gathered and utilized to continuously improve the integration of online resources, ensuring they remain effective and aligned with learning outcomes.

Incorporating a variety of learning strategies (multimedia resources such as videos,

interactive simulations, and digital textbooks), to cater for different learning styles and enhance student engagement should be encouraged. There should be collaborative learning to promote the use of online discussion forums and collaborative platforms to encourage peer interaction, teamwork, and the development of essential skills such as communication and

critical thinking., hence, lifelong learning skills is fostered.

By addressing these recommendations, educational institutions can maximize the potential of online resources in enriching curriculum content, ultimately leading to improved student outcomes and a more dynamic, inclusive, and effective learning environment.

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Digitalization of adult Education Programmes for Socio-Economic Growth; Societal Development; and Sustainability in Nigeria

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Abstract

All societal development and sustainability desires of many nations are mainly anchored on the social and economic growth of their citizens; which necessarily depends on the level and utilization of information services, and dissemination. Based on this fact, the paper presents a picture of digitalization of adult education programmes for socio-economic growth, and societal development and sustainability in Nigeria. The burning issues that are x-rayed include: digitalization and integration, adult education, adult education programmes and digitalization, socio-economic growth and societal development; prospects of digitalization of adult education programmes, and the demerits of digitalization in adult education. The paper concludes among other things; that there are outweighing prospects for integrating digital information services into adult education teaching and learning programmes. The researchers suggest among others: that government at all levels should objectively sponsor adult education, by equipping adult education centres and institutions with the essential ICTs, needed for boosting life-long learning, socio-economic growth, and citizens participation in societal development and sustainability in Nigeria.

Key Words; Digitalization of Adult Education, Socio-Economic and Societal Development.

1.0 Introduction

Digital information services are one of the most powerful inventions made so far, which have evolved immense development in the worldwide, enabling desired positive changes in various aspects of human life and the environment. Essentially, information cannot be separated from human existence, because information is power, vital, and the best option for building functional citizens for socio-economic development and sustainability in a society (Lahka, 2024). According to Mike (2021), the relationship between digital information services and solving human and societal cum environmental challenges are multifaceted, and stands to be applauded. Environmental problems are changes in a society which affect the health

and economic productivity of the society, and which in turn affect human wellbeing. The way and manner to which socio-economic growth is being degraded in Nigeria is becoming very alarming. The entire human race and habitation are characterized by developmental challenges. Ranges from: depravities in our educational system to the workers incompetence and productivity, poverty, environmental degradation, unemployment, adult illiteracy, sex disparities, and the increasing deadly pandemic diseases (Adire, & Amadi, 2022).

Accordingly, Stephen and Chidiogo (2024) maintain that utilization of ICTs tools in Adult education have significant impacts in the adults' socio-economic acquisitions, growth and participation in societal development. Donna

(2019), utilization of emerging information technologies are driving significant changes in different sectors, like: online teaching and learning, personalized education, skill development, healthcare--telemedicine, precision medicine, health data analysis, governance, and lots more. Though these awesome services derived from integrating information technologies in the above mentioned sectors are gravely endangered in Nigerian societies due to people's inadequacy and illiteracy on using information technologies in the required areas of their jobs and activities (Stephen, & Chidiogo 2024). Application of information technologies have made the world a global village. Man through series of migration has spread to the utmost parts of the earth which have a higher need of good information service education, assessment, and dissemination. On this point, Dokubo, Akpama, and Orgwu (2022) opine that digital information services have revolutionized education in the world, providing online platforms and resources that enable all people to acquire new skills and access various educational courses of their choice, thereby promoting socio-economic growth and sustainable development. But the question is, how far, is clarion demand/quest for integrating ICTs in educational systems, for socio-economic and development, have been attended to, or achieved in Nigeria and her citizenry.

2.0 Digitalization and Integration

Digitalization as a concept refers to the process of converting analog information, activities or processes into existing digital form, using digital tools, platforms, and data to transform processes in various aspects of life processes. Be it in teaching-learning process, business, health, economic growth and productivity, governance and so many others. On this point, acquisition of digital literacy is everybody need and paramount in the 21st century development goals. Digital literacy is the ability to operate computers and digital devices or use general purpose software and internet services (Oladimeji, 2021). Digital literacy was built upon the elements of ICTs literacy includes a variety of knowledge, attitudes and complex skills (technological, cognitive, learning, social and emotional) which individuals need to function effectively in contemporary digital environments; and as well as to enhance innovation, efficiency,

productivity, business, healthcare, governance, create and share information and knowledge in multiple formats and so on (Amadike 2022, Mkandawire,2015).

On the other hand, integrating of Information and Communication Technologies and online platforms into Adult education entails incorporating digital tools, resources and methodologies into Adult education programmes cum educational practices (Teaching and learning processes). Adult education programmes are wildly learned and objectively acquired by the adult learners by using the related information technology tools and services (Otty, Mbaegbu & Igbokwe, 2024). Accordingly, Dokubo, Akpama & Orgwu (2020) maintain that engaging technologies in Adult education boosts the quality, accessibility and the effectiveness of adult learning programmes to the expected goals.

Digitalization has gained significant attention and maximum prospects in distance education teaching and learning programmes in the recent time. Generally, distance education programmes utilize various technologies or digital devices. Such as: computers, smartphones, Google tablets, E-learning platforms and learning management systems, Google meet, zoom, Artificial intelligence-powered adaptive learning, smartphones; online course and Virtual classrooms and audio/video conferencing tools, online collaborative platforms, simulation and others to operate (Beke, 2021; Mike, 2021). Consequently, Anulobi, Ukaegbu and Anuonye (2020) submit that the use of information service devices is everywhere in teaching and learning system, and with numerous prospects. Learners use various technological apps and tools to study at their own pace and time, without the aid of the classroom facilitators. They further submit that a facilitator can teach the learners, post homework, and carried out continuous assignments for the learners to do by creating a class website, with the web page designed to enables the learners display their works at ease, which off courses, boost more inclusive, effective and future-oriented individuals, and independent learning system. Tukur, Bedeji and Suleiman (2021) maintain that utilization and acquisition of Information service technologies enhance economy, innovation, learners' knowledge, job

mastering-productivity, and competencies for self-actualizations and societal services.

2.1 An Adult; and Adult Education

The concept “an adult” as a key word in Adult education is an essential status to attain and with conferred roles and responsibilities to attend. Viewing the sociological analyses of adulthood. An adult is often an undefined subject who inhabits a sort of timeless and changeless plateau, located between the end of the age of evolution and the beginning of the age of involution (Hoare, 2020). Adulthood and adult is a stage of life, measured with some conditions of life and involvement in adulthood. Such measures as: complete maturity of physical and intellectual well-being; having cultural context of belonging to a community and their lifestyles; being socio-economic fit; ability to make valued decisions and take responsibility for oneself; being responsible for one’s actions and consequences of one’s behaviours as stipulated by law; and ability to solve personal problems and participation in societal growth and development (Tukur. Bedeji, & Suleiman 2021). Nzeneri in Otty (2021) states that an adult is a person who is physical and psychologically mature and with assumed socio-economic responsibilities for self and for the society. An adult is ideally being able to think and consider the effects that what an adult does on himself and on others. Hence, an adult is not a child, and a child is not an adult. On the other hand, the term “Adult education” is an important logo in all areas of human endeavors. It is an icon, purposefully designed for empowering adults to build up themselves and their socio-economic growth and sustainability. Adult education can be described as a discipline or an educational field of study and training, with the utmost aim and vision to help adults in the society acquire prosperous

skills and knowledge to fulfill life aspirations and participation in their social welfares development (Ihejirika, & Otty,2020). It is an awakening mechanism used to tap and modify the cognitive, affective and psychomotor talents and potentials acquired for a fulfilled (Umezurike, 2017). Similarly, Otty (2021) submits that Adult education is any education given to men and women based on their social, political, cultural and economic needs; which enables them adjust fully to changes and issues in life and community.

Currently, many countries of the world have placed much hope in using adult education to achieve their developmental goals and aspirations which Nigeria is not left out. Adult education lays much emphasizes on human growth, social, economic and environmental development and stability (Tukur. Bedeji, & Suleiman 2021). The contingencies of desirable change in our societies today focus on people and how to improve their socio-economic status to overcome underdevelopment, moral depravity and other ugly situations in people’s lives and society through education. Otty (2021) opines that Adult education is a wide field of study that deals with diversity of educational needs of the adult and groups, as well as people with special needs. It is also a collective name for all forms of learning programmes in which people regarded as adults in the society which they belong participate in, to develop their abilities, enrich their knowledge and improve their technical and professional qualifications that enable them meet their needs and that of their society. Stephen and Chidiogo, (2024) deduced that human growth and societal development may not be optimally attained if much emphasis is not attached on the tenets of digitalization of adult education programmes.

2.2 Adult Education Programmes and

Digitalization

Adult education programmes encapsulates among others: literacy education, health education, vocational education, agriculture, business education community education, women education and so on. These programme are planned and executed having formative effects on the beneficiaries’ life endeavours.

Otty, Mbaegbu and Igbokwe (2024) submit that information and communication technologies (ICTs) boost personalized learning and people’s economic growth. Digitalization of adult education improves flexibility and accessibility to the adults. Online devices or tools allow adults to learn at their own pace, anytime, and anywhere, thereby reducing barriers for peoples’ quests for educational acquisitions and increasing socio-economic standards and so on.

Furthermore, Beke (2021) in her study found out that there are proactive spread of narratives in ICT-supported education, focusing on the concepts “online digital education and blended learning, hybrid learning immersive aids on distance education platforms of academic institutions in teaching and learning; and on dissemination of COVID 19 Pandemic preventive inform. On this point, integrating technologies into adult education programmes in this 21st century era, can be an optimal way for creating mode of learning and growth where adults can access educational resources, courses and programs remotely, without being physically present in a traditional classroom setting (Amanda 2019). Digital learning approach cuts across various sectors of human socio-economic needs, to mitigate obstacles for adults’ educational pursuit and others. Indeed, digital technologies are revolutionizing acquisition and delivery of Adult education programmes, making them more accessible, engaging, and effective.

2.3 Literacy Education Programme

Literacy is described as the ability to read, write, and calculate numbers well enough to perform tasks considered essential to people’s daily lives and survival. It is a foundation for lifelong learning and a catalyst for people’s growth in social, cultural, political and economic. Literacy is concerned with attaining a degree of ability to identify, understand, interpret, create, communicate, and compute figures using printed and written materials to achieve one’s goals in knowledge, and learn basic skills necessary for one’s achievements and successful involvement in societal development (Mkandawire, 2025).

Every sector of societal development and sustainability requires some level of literacy. This entails that literacy is beyond gaining the skill of reading, writing and computing figures to include the sense of developing cognitive, and psychomotor domain for self-actualization and enhanced economic change to societal relevance. Oladimji (2021) state that universal digital literacy is vigorously pursued across the world as a vital key for civilization and national development. Hence, integrating Information and Communication Technologies (ICTs) into Adult education gives adults opportunities to

develop digital literacy skills to stay competitive in the modern work services and in the digital age knowledge. Digitalization of Adult literacy programme can provide adult who committed it with opportunities to acquire right attitudes, norms, values and morals required to live peacefully in the society. Which in turn, fosters national development, personalized learning and individual independence (Stephen, & Chidiogo, 2024).

The information technologies for transiting literacy programmes/lessons to the adult learners include among others; online learning platforms like: Learning Management System digital literacy software, E-books and articles; these are digital versions of text books, journals, E-platform, articles accessible through e-libraries and other online platforms, video conferencing tools like Zoom, Google Meet, and Skype for remote instructions. All these and other technological devices used in literacy programme boost the clienteles’ skills, knowledge, attitudes and insights which enable them contribute in mitigating racial discrimination, social ill activities and other challenges that limit individual and national growth and development in any angle (Simplilearn (2023; Beke, 2021;). Consequently, Stephen and Chidiogo (2024) state that digitalization of adult literacy education is the hallmark for impacting a populace with lifelong knowledge and attitudes necessary for long-term national development and sustainability.

2.4 Health Education Programme

Health is body’s ability to resist becoming ill, a force that opposes suffering and favors recovery. Health education is a programme that plays a pivotal role in promoting the acquirers’ health knowledge and practices that enhances better health outcomes, and reduces health casualties and death in a society. Quoting Lam, Kor and Wang (2023), digital health technologies have grown rapidly in the past few decades because of the exponential increase in computation power, reducing cost of data storage. With the development of ultra-speed internet connections and lowered cost of internet services, computer, smartphones, and smart wearable devices. Furthermore, digitalizing of Adult education health programme is of great importance for an

adult as a person, his/her community and the nation at large.

To Helpburn (2017), online health lessons empower adults in varying capacities and degrees, by taking control of their health, understand basic health information, make informed health decisions on their health conditions, and advocate for themselves and others on health issues. Health education can come through different online programmes that seem to have applicable to the targeted audience anywhere in the world. A few notable ones are: health education website;- online resources that provide informative content, tutorials, and workshops on various health topics; telemedicine or Telehealth Services; – visual consultation platforms that connect adults with healthcare professionals for remote consultations; Teladoc—offers a broad range of services, including behavioural health, chronic care management, and specialist consultations. It is an advanced features like: AI-powered symptom checkers Mend- a user-friendly platform that focuses on patient engagement. Inadequate/primary health literacy skills by the adult members of a society is linked to an increased risk of hospitalization, poor hygiene, inconsistency follow up care, poor medication, and high mortality rate (Rendal,2025; Lam, Kor, & Wang 2023).

Digitalization of health education programmes are vast and promoting. Digital health technologies/ internet-based interventions have revolutionized the way healthcare is delivered to the remote adults, and to the underserved populations. Thereby bridging the gap in health education knowledge, awareness and accessibility; and enhancing the healthcare abilities of adults with varying schedules and locations.

2.5 Agriculture Education Programme

Agriculture is one of the Adult education programme of activities. Agricultural sector is a significant contributor to global economic, and as well crucial for achieving both individual and National Sustainable Development Goals (SDGs) of nations, Nigeria, precisely. Agriculture is the practice of cultivating land, raising animals, and producing food, fiber, and other products

essential for human livelihood. It involves the management of natural resources, such as: soil, water and biodiversity to create a sustainable and productive agricultural ecosystem. Agriculture include crop production (grains, fruits, vegetables, citrus etc.); Livestock farming (animals, dairy, poultry and so on); Fisheries and aquaculture; Agroforestry (integrating trees into farming system); Apiculture; (beekeeping) and others. For thousands of years, the importance of agriculture in everyday life and people survival cannot be minimized Nzekwe (2023). Agricultural development reduces poverty, raise income and improved food security, healthy, and inclusive food systems critical to achieve the world's development goals and shared prosperity and feeding a societal projects. Agricultural food systems is a powerful tools that can heal the planet, reduce emission and drive growth (Obiozo and Otty, 2022; Maryville University, 2022).

Integrating technologies into agricultural programmes cum teaching-learning and trainings enables farmers to access precision agricultural techniques and tools needed for their individual specialties or needs; have access to online resources for crop management and soil conservation; market information and market prices, provide farmers with real-information on weather, decision on crop management, online communities and forums for knowledge, skills, production and networking sharing etc. Digitalization of agricultural programme makes learning more interactive, accessible and engaging to the adults, thereby promoting their agricultural productivities and participation in community development and others (Nwakoezuike, 2024).

2.6 Economic Education Programmes

In adult education, economic education refers to the process of educating, and training individuals who are committed to it about economic concepts, principles and systems that can empower them with knowledge, skills, insights and critical thinking abilities to make formal or informal decisions on their businesses and finances (Albert 2019). It also encompasses of exploring strategies for peoples economic growth and development, and utilization of the dividends to solve both personal and community

needs. Economic education promotes economic growth, poverty reduction, and job creation. Ihejirika and Otty (2020) opine that Adult education programmes aim at educating adults on the development of entrepreneurial skills that boost economic growth and economic understanding, necessary to navigate economic crunch and participation to social welfare and sustainability of the nation. Stephen and Chiogo (2024) in their study ascertained that utilization of digital virtual contents, and reality information technology devices to economic education platforms can offer effective tailored economic learning pathways, and interactive stimulations to a wider audience at their varying door posts and needs. Therefore, digitalization of Adult economic programmes can grossly improve learners' knowledge, financial stability, career prospects, and be more engaged citizens in economic power and sustainability.

Quoting Alaoma, (2023), Socio-economic development is the process of improving the overall wellbeing and quality of life of individuals, communities and societies through:

- Economic growth (increasing citizens' income, employment, and economic opportunities);
- Social inclusion (promoting equity, equality, and social quality);
- Social progress (improving education, healthcare, housing, and social services)
- Human development (boosting peoples knowledge, skills, attitudes, and capabilities)and
- Environmental sustainability (conserving natural resources, and mitigating climate change).

2.7 Business Education programme

Over the years, Adult education is expressed within three dimensions of educational process, to include: general education, business education, and the study of technologies and the relevant to meet up with global trends in business and socio-economic development. This signifying that adult education has been linked to a myriad of the most pressing and compelling topics and themes of its day's involvement in business education and ICTs (Okifo & Ayo, 2015). Accordingly, Onugu and Mbaegbu (2022) state

that business education offers the requisite knowledge, skills and attitude for harnessing business acumen and other resources that empower learners to create sustainable ventures, to combat unemployment and unskillfulness in one's life and in the society at large. Onugu and Mbaegbu further stated that digitalization of business education programme serves as an engine for increased economic growth, job creation, employability, and increased income status that lead to significant national growth and development.

Okifo and Ayo (2015) maintained that technologies in business education teaching - learning improve to a large extent, the skills and knowledge needed for forever green economic prosperity, and development in the production sectors. To Biney (2021), digitalization of business education programmes boosts entrepreneurial mindset of the learners, and getting young adults much involved in both business and production industries. Studies have also shown that digital business education make students to be opportunity-focus, and attuned to business entrepreneurship as the ideal way to create their own job security, and career success. Biney further stated that digitalizing business education programmes is vital in making economic development to remain a long-term expansion of a society's economy system healthy and thriving.

2.8 Socio-Economic Growth

Socio-economic on this work is viewed as growth to the simultaneous improvement in both social and economic indicators, leading to an increased in a better quality of life for a nation's populace or citizens. The indicators of socio-economic development include: GDP per capital, poverty rates, life expectancy, literacy rates, unemployment rates, income inequality, and human development index (HDI) and societal development. Socio-economic development involves improvement in qualitative, quantitative, or both in the use of human capital and availability of societal resources.

An increase in socio-economic growth improves growth and development in a nation in several ways like: increased education, reduced poverty

and inequality, improved GDP and economic stability, productivity; infrastructure, investment in human capital- reduced dependency on a single industry, and good governance. As socio-economic growth increases, people's incomes also rise, thereby allowing them to afford better housing, healthcare and education. (Alaoma, 2023) states that the more peoples incomes rise, the greater their access to improved education and healthcare, innovation and entrepreneurship desire become more likely to flourish.

By a nation that focus on their socio-economic growth, creates more equitable attains quick sustainable future for their citizens. Digitalization of socio-economic in Adult education are vast and transformative. Digitalization revolutionizes various aspects of society. Including the economy, education, increased efficiency, global connectivity health care and so many other things that lead to intensive increase in socio-economic GDP, employment opportunities, prosperity and social sustainability of people and their community engagement (Ekesionye, & Okolo, 2019).

On the other hand, "societal development" in Adult education context is a hybrid term for myriad of strategies adopted for socio-economic and environmental transmission to the desirable current state. It also refers to improvement and development of a society's, overall well-being, quality of life, social structures as well as the conditions for realization of human personality and responsibilities. Societal development process provides opportunity for involving and motivating people in a society to participate actively in solving their societal problems. While the concept "sustainable development" refers to development model that meets the needs of the present, without compromising the ability of the future generations to meet their own needs. It lays much emphasizes on social, economic and environmental development and stability. It balances economic, social and environmental considerations to ensure prosperous, equitable and environmental conscious future. Social sustainability entails ensuring access to education, healthcare, human rights and social justice. Economic sustainability means promoting economic growth, poverty reduction, job creation and other. While environmental sustainability entails protection

conservation of natural resources, reducing pollution and mitigating climate change management.

Sustainable development aims to eradicate poverty and hunger; protects environmental and natural resources, social human rights, supports economic growth and provides many access to education (Anonymous, 2024). Commenting on the above reviews, one can deduce that, there is a relationship between integration and utilization of emerging technologies in Adult education for the 21st human and societal development and sustainability.

3.0 Prospects of Digitalization of Adult Education Programmes

The prospects for integrating emerging technologies into adult education cannot be over emphasized. Leveraging digitalization into adult education focus essentially on building functional adult citizens, socio- economic growth and people participation in societal development and sustainability. According to Otty, Mbaegbu, and Igbokwe, (2024), Beke, 2021; Anulobi, Ukaegbu, and Anuonye (2020), and others views on integrating ICTs technologies in Adult education programs as a veritable tools to attain the 21st century socio-economic growth and development are unlimited. Among others are:

- Online learning fosters collaboration and knowledge sharing among the adult learners, and opens up remote job opportunities to them.
- Promotes economic growth, poverty reduction, job creation and food security.
- Technology literacy skills gives adult learners' access to online training, and also boost their confidence in speech, boldness and overall personal growth.
- Support sustainable agriculture and rural development
- Provides concrete experience, and sustain greater retention to adult learners;
- Reinforce interactivity and collaboration, as well as adult learners interest to learn;
- Renders continuous update to the adults, and keeping pace with rapid technical challenges and updates

- Online digital literacy reflects a wide range of skills, knowledge, understanding and attitude about critical and safe use of ICT; to achieve goals related to personal development, education, employment, entertainment and participation in social and civic engagement activities;

Digitalization reduces cost effectiveness than traditional resources. Learners do have same access to the educational materials regardless of their location or socio economic status;

- Online learning offer varieties of learning opportunities beyond the classroom instruction/ learning;
- Higher learning studies: studies show that adults with higher literacy levels tend to earn higher salaries and values.
- It encourages pursuit of lifelong learning in adult learners which aid adults to contribute their quota in societal development and sustainability at the long run.
- Enhances inclusive economic policies among the adult learners in their remote areas, boosts investment in human capital and social services.

According to Stephen and Chidiogo (2024), technologies are redefining adult education landscapes, by offering it the opportunities for:

- Personalized learning pathway, and enhanced learning engagement;
- Increased access and inclusivity;
- Improved skill development;
- Effective assessment and feedback.

Studies have shown numerous groups of the modern technologies that can be adopted for intensive innovation, and improvement in field of general educational transition to include among others are:

- i. Artificial intelligence (AI): Personalized learning, adaptive assessment, and intelligence tutoring systems.
- ii. Virtual and augmented reality (VR/AR): immersive learning experiences, interactive stimulations, and enhanced engagement.
- iii. Blockchain : secure digital credentials, decentralized learning platform etc

- iv. Internet of Things (IoT): Connected learning environments, smart classrooms, and sensor based feedback.
- v. Gasification: Engaging learning experiences, interactive challenges, and motivational feedback,
- vi. Microlearning: Bite-sized learning modules, just-in-time training, and flexible skill acquisition.
- vii. Quantum Computing: Advanced simulations, complex data analysis, accelerated scientific discovery.
- viii. Robotics: interactive learning companions, robotic tutors and hands-on STEM education (Source: AI website).

3.1 Demerits of Digitalization of Adult Education Programmes

- Adult learners may lack the necessary digital skills to effectively use information technologies which can exacerbate existing inequalities in education;
- Implementing and maintaining many of the technologies can be expensive to adults may not have the financial resources to buy or maintain;
- Resistance to changes: some adults may be hesitant or resistant to adopting newly technologies because of age or health issues;
- Adults may refused dependence on technology to prefer face-to face interaction because adults remember life actions than over-reliance on technological gargets and robot plays that divert interest;
- Technical issues and connectivity problems;
- Difficult in staying engaged and motivated;
- Limited access and poor electricity supply and bills meet-up educational needs and time.

4.0 Conclusion

The paper therefore concludes that; there are outweighing prospects for integrating digital information services into adult education teaching and learning programmes. As well, digital information services promote collaboration, personalized learning, and acquisition knowledge and skills needed for socio-economic growth, and satisfaction of the adults' needs, and contributions in societal development and sustainability in Nigeria.

Suggestions

In view of the foregoing, the researchers suggest the following:

- i. Government at all levels should objectively sponsor adult education, by equipping adult education centres and institutions with the essential ICTs, needed for boosting lifelong learning, socio-economic growth, and citizens participation in societal development and sustainability.
- ii. Pedagogical challenges in utilization of technologies in adult education programmes require changes in teaching method, approaches, careful planning, and rendering meaningful supports by the government and private companies—organizations, in providing digital devices/tools, and community learning centres that can accommodate both the informed and the underserved community individuals in the acquisition of digital knowledge, for effective national development and global world marked.
- iii. Trained adult educators are more job oriented than employing those who are mediocre. Therefore seminars, workshops mentorship, performance management and many others should be intermittently given to adult facilitators to enhance their knowledge and expertise on the use of information technologies on teaching and learning adult programmes.
- iv.

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Analysis of Students' SSCE Achievement Score in Biology: Modeling Gender for Effective Curriculum Implementation

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Abstract

The study adopted mixed method approach. The study population consisted of all SS 3 students who were prepared to sit for SSCE Biology in the 2023/2024 academic year in Owerri Municipal. A total sample size of 163 students was used. Adapted 2023 SSCE (WAEC) Biology Achievement Test (BAT) and Biology Teachers Curriculum Implementation strategy questionnaire were used for data collection. A reliability index of 0.72 and 0.84 were obtained using Kendal coefficient of concordance and Kuder-Richardson formula for the essay and multiple-choice questions respectively. Cronbach's alpha index of 0.77 was obtained for the 25 items Biology Teachers' Curriculum Implementation Strategies Questionnaire (BTCISQ). Data obtained were analysed using mean and standard deviation, Pearson product moment correlation coefficient, t-test and linear regression. **The result:** shown a mean difference in the academic achievement of male and female students in SSCE Biology. Biology teacher's curriculum implementation strategies contribute to students' academic achievements in both male and female students. Amongst the researchers other recommended that Biology teachers should be given training on professional development programs for effective curriculum implementation strategies to further enhance male and female students' academic achievement in Biology.

Keywords: Gender, SSCE, Biology, Curriculum Implementation

1.0 Introduction

The knowledge gained by the end of senior secondary school level in the Nigerian education

system is usually measured in a summative form of examination. This form

of examination is administered by a well-established examination body. Significant among these bodies are the West African Examination Council (WAEC) and National Examination Council (NECO). There examination called the Senior Secondary Certificate Examination (SSCE) is a significant achievement that is critical in the education System of West Africa and Nigeria in particular. At senior secondary school level in the Nigerian education system, Biology is one of the science subjects that is studied (Enebechi, 2021). Students who are pursuing careers in medicine, agriculture, biotechnology, and other life science-based fields undertake this subject from senior secondary one to three (SSI-SS3). Biology as a science subject plays' vital role in exposing students to essential knowledge that will aid their choice of future career, especially in the field of life sciences.

Biology is a science subject which studies life of organisms and their surroundings (Fowler, Roush, & Wise, 2024). This subject is vast in nature with topics that accommodate several botanical and zoological terminologies, as well as practical class sessions. Over the years, examiners and other stakeholders have shown concern about the students' performance in SSCE Biology. In Piwuna, (2023), WAEC and NECO Chief Examiners have repeatedly reported poor performance of candidates who sat for Biology for over 20 years. They use regularly remarks such as “not satisfactory”; “downward trend”; “abysmal/dismal performance” “decline in pass rate”; “fluctuating performance”; and persistent failure”; in describing the performance of students (WAEC and NECO Chief Examiners' reports, 2016, 2017, 2018, 2019, 2020, 2021). Studies have revealed that factors such as teaching method, school and classroom environment, and curriculum design can contribute to student performance in Biology (Oladejo, et al, 2023; Suwono, et al, 2023 & Cayubit, 2022). Despite these known factors, gender as an indispensable socio-demographic factor has been studied to be a probable variable that mediate influence and

effect of infrastructural and instructional factors on educational outcome of students (Verdugo-Castro, García-Holgado, & Sánchez-Gómez, 2022; & Ramdani, et al, 2021). However, disparities in students' academic outcomes may have been caused by their gender (Obikezie, Nwuba, & Ibe, 2023).

Gender is a societal and cultural construct that has long been studied in the field of science education. Finding of studies on gender has shown that male students tend to have more positive outcome than female students in science related subjects (Ramdani, et al, 2021; Starr, & Simpkins, 2021). Gender, judgementally explains the performance of male and female students which leads to assignment of roles to those identified as male or female at birth. This projection gives a stereotypic construction that can limit the potentials of talented students. Female students are usually discouraged from attending to science subjects due to the stereotypic deductions from societal theories and societal assignment of roles to those assigned male or female at birth. This ideological biasness has negatively influenced the participation of female students in science subjects (MQADI, 2024); especially in Nigerian schools. Contrastingly, studies also revealed that female students have shown better achievement in sciences than male students in science related subjects (Noroozi, et al. 2023). For effective implementation of science curriculum, factors militating learning of science subjects needs to be addressed.

However, curriculum designed has no room for bias. Curriculum designed should have equal opportunity for both male and female students to actualise their objectives. The variation in the performance of male and female students in SSCE has been linked to curriculum implementation. Implementation of curriculum such as Biology curriculum has a potency of affecting students' performance in all forms Biology examinations. Effective implementation of curriculum should not only cover theories, but should lay more emphasis on hands-on-minds on activities (Young, 2002; Hodge-Zickerman, Stade, & York, 2021). This includes laboratory and field studies where much emphasis should be laid on the pedagogical practices towards effective hands-on science (Ligado, Guray, &

Bautista, 2022). The level of engagement of male and female students in these practical activities has varied with prevailing stereotypic situations and expectations associated with gender. Gender stereotype/ biases becomes pertinent to be minimised even in early childhood and adolescent stages (King, et al. 2021). However, this can be possible through effective curriculum implementation.

The sensitivity of teachers in adopting teaching methods that address learning needs of both male and female students is paramount to effective curriculum implementation. Alameddine and Chehimi, (2024) posited that inclusive approaches should be adopted such as inclusive teaching strategies, -collaborative learning, mixed-gender group work, being neutral in recognising both genders. Ayeni, & Jajua, (2021) posited that a well implemented curriculum encourages students' academic achievement in any subject. These approaches can bridge the gaps in performance between the male and female students. Tao, Meng, Gao and Yang, (2022) mentioned that there is a relationship between what teacher does in teaching and students' academic achievement. It is pertinent to note that teachers' activity accounts very much in the student's performance (Assem, Nartey, Appiah, & Aidoo, 2023); especially in external examination. Again, well prepared students are confident with themselves and performs better than students who are not well prepared. Contrastingly, Antony and Elangkumaran, (2020) stated that, students' academic achievement in sciences subjects was not related to teacher qualification and methods. The argument here is that students take part in extra lessons at home and elsewhere as well as make use of ICT facilities, mobile cell phone, laptop, etc. Gajic, et al (2021) posited that students can learn Biological concepts through group reading among peers and that teachers' activities in Biology class has little or no relationship with student's academic achievement in Biology.

It is pertinent to note that adoption of gender responsive approach can ensure equal opportunity to male and female students to reach their full potential in academics. Unfortunately, Olutola, (2017) posited that female students have better performance in Biology than male

students in the urban where there is equity in accessing learning resources because they are more readily available. However, research result revealing gender disparities in science subjects are narrowing. Female students in recent times engage in science, technology, engineering, art and mathematics (STEAM) through targeted educational programs (Belbase, et al, 2022). Where critical factors can determine students' academic performance such as quality of test and test administration, school environment and management, and access to resources; however, gender may mediate their effects and influences. Against these backdrops, the researchers therefore analyse students' SSCE performance score in Biology: Modelling gender for effective curriculum implementation.

Based on the above, the researchers decided to investigate into the following;

- i. Mean academic achievement score for male and female students in WAEC 2023 Biology SSCE in Owerri Municipal.
- ii. Examine the relationships between academic achievement score of male students in WAEC 2023 Biology SSCE and their perception of Biology teachers' Curriculum implementation strategies in Owerri Municipal.
- iii. Find out the relationship between academic achievement score of female students in WAEC 2023 Biology SSCE and their perception of Biology teachers' Curriculum implementation strategies in Owerri Municipal.

2.0 Research Questions

- i. What is the mean academic achievement score of male and female students in WAEC 2023 Biology SSCE in Owerri Municipal?
- ii. What is the relationship between academic achievement score of male students in WAEC 2023 Biology SSCE and their perception of Biology Teachers' curriculum implementation strategies in Owerri Municipal?
- iii. What is the relationship between academic achievement scores of female students in WAEC 2023 Biology SSCE and their perception of Biology teachers' curriculum

implementation strategies in Owerri Municipal?

2.1 Hypotheses

- There is no significant difference in the mean academic achievement score of male and female students in 2023 Biology SSCE in Owerri Municipal
- There is no significant relationship between academic achievement score of male students in 2023 Biology SSCE and Biology teachers' curriculum implementation strategies in Owerri Municipal
- There is no significant relationship between academic achievement score of female students in 2023 Biology SSCE and Biology teachers' curriculum implementation strategies in Owerri Municipal

3.0 Method

Mixed-method (descriptive and correlational survey research designs) was the approach adopted to analyse students' performance in Senior Secondary Certificate Examination (SSCE) Biology result: modelling gender for effective curriculum implementation. According to Nworgu (2015), descriptive survey enables the collection of data on, and describing in a sequentially, the characteristics/ features about a given population. This designs became appropriate for this study because the researchers want to describe students' SSCE performance score in Biology. The study examined how students performed differently due to gender (the independent variables), and how male and female students' SSCE performance score in 2023 WAEC Biology examination (the dependent variable) correlate with Biology teachers' curriculum implementation strategies by testing present SS3 students and analysing their score on 2023 SSCE Biology questions.

The study population consisted of all SS 3 students in public schools who are prepared to sit for SSCE Biology in the 2023/2024 academic year in Owerri Municipal. Five secondary schools in Owerri municipal were randomly

selected by ballot with replacement. One intact SS 3 class was selected from each school for the study. Each intact class from each of the five schools were selected using simple random sampling technique. This constituted five intact classes. A total sample size of 163 students was used. The sample was unequally distributed in which male students were (84) and female students were (79) from five public secondary schools in Owerri municipal.

Data were collected by administering the adapted official 2023 WAEC SSCE Biology achievement Test, which consists of essay and multiple-choice questions. This instrument was adapted from the West African Examinations Council (WAEC). The researchers used the instrument provided to obtain students' performance scores in Biology. The 2023 WAEC marking guide was adapted and was used to score student responses. Researchers structured 25 items Biology Teachers' Curriculum Implementation Strategies Questionnaire (BTCISQ) was used. This instrument was on a four-point scale of Strongly Agree (4), Agree (3), Disagree (D) and Strongly Disagree (1). It was used to elicit information on students' gender and their perceptions on curriculum implementation strategy. Information on gender served as the basis for analysing variables under investigation.

The 2023 WAEC SSCE Biology question instrument was adapted and a reliability index of 0.72 and 0.84 were obtained using Kendal coefficient of concordance and Kuder-Richardson formula (KR-20) for the essay and multiple-choice questions respectively. Kendal coefficient of concordance was used to ascertain consistency of raters scores in the essay questions. KR-20 was used because the items of the multiple-choice questions were dichotomously scored (wrong or right answer). However, BTCISQ yielded a cronbachs alfa reliability coefficient of 0.913 on SPSS scale analysis. Cronbachs alfa was used because the items were polytomously scored. These scaling were done after trial testing of the instruments on a different population sample of the study in Ehime Mbano L.G.A

The data were analyzed using mean and standard deviation for research question one. Pearson Product Moment Correlation Coefficient

(PPMCC) and coefficient of determination were used to answer research question two and three. t-test was used to test hypothesis one. While linear regression was conducted to determine the significance of the relationship between male and female student's achievement scores in 2023 WAEC SSCE Biology and their response scores on Biology teachers' curriculum implementation strategies.

Researchers obtained permissions of school management and the WAEC, to study their students and have access to the necessary examination instrument respectively. The confidentiality of students' personal information was maintained, and data obtained was used solely for this academic exercise.

Results

Table 1:

Mean achievement score of male and female students in WAEC 2023 Biology SSCE in Owerri Municipal

Hypothesis 1: independent sample t-test on mean performance score of male and female students in 2023 Biology SSCE in Owerri Municipal

Source of Variation	n	X	SD	df	t	Sig.
Male	84	68.66	10.87	161	8.43	0.000
Female	79	50.73	15.93			
N	163					
$\alpha= 0.05$						

Result presented in table 1 reveals the mean achievement scores of male and female students in WAEC 2023 Biology SSCE in Owerri Municipal. It also reveals the tested hypothesis of no difference between the achievement score of male and female students using t-test. The male student with a study sample of 84 have mean score of 68.66 and standard deviation of 10.87 contrary to mean score of 50.73 and standard deviation of 15.93 of 79 female students who sat for the test. However, to test for

further variation in the academic achievement score of the students, independent sample t-test was conducted which revealed a degree of freedom of 161 and a probability value of 0.000. Hence, the Sig. value which is below 0.05 level of significance indicated that, "there was a significant difference in the academic achievement of male and female students in Biology SSCE". Therefore, the hypothesis of no difference was rejected.

Table 2:

Relationship between academic achievement score of male students in WAEC 2024 Biology SSCE and their perception of Biology teachers' curriculum implementation strategies in Owerri Municipal

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Model	N	R	R ²	Adjusted R ²
1	84	0.452	0.205	0.195

Result presented in table 2 revealed the relationship between academic achievement score of male students in WAEC 2023 Biology SSCE and their perception of Biology teachers' curriculum implementation strategies in Owerri Municipal. The table revealed a moderate positive relationship with a Pearson correlation

coefficient (R) of 0.45. However, an associated coefficient of determination (R²) of 0.205 indicated that 20.5% of male students' academic achievement in Biology SSCE was attributed to Biology teachers' curriculum implementation strategies.

Table 3:

relationship between academic achievement score of female students in WAEC 2024 Biology SSCE and their perception of Biology teachers' curriculum implementation strategies in Owerri Municipal

Model	N	R	R ²	Adjusted R ²
1	79	0.957	0.915	0.914

Result presented in table 3 revealed the relationship between academic achievement score of female students in WAEC 2023 Biology SSCE and their perception of Biology teachers' curriculum implementation strategies in Owerri Municipal. The table revealed a very high positive relationship with a Pearson correlation

coefficient (R) of 0.957. However, an associated coefficient of determination (R²) of 0.915 indicated that 91.5% of female students' academic achievement in Biology SSCE is attributed to Biology teachers' curriculum implementation strategies.

Table 4: Regression ANOVA of the Significance of the relationship between academic achievement score of male students in 2023 Biology SSCE and Biology teachers' curriculum implementation strategies in Owerri Municipal

Model	Sum of Square	df	Mean Square	F	Sig.
Regression	2008.916	1	2008.916	21.09	0.000 ^b
Residual	7807.751	82	95.216		
Total	9816.667	83			
$\alpha = 0.05$					

Result presented in table 4 revealed an F-ratio of 21.09 and associated probability value of 0.000^b. In determining the significance of the test, the probability values of 0.000 was compared against 0.05 apriori constant. The comparison revealed that there was a significant relationship.

Table 5: Regression ANOVA of the Significance of the relationship between academic achievement score of female students in 2023 Biology SSCE and Biology teachers' curriculum implementation strategies in Owerri Municipal

Model Square	Sum of	df	Mean Square	F	Sig.
Regression	18126.002	1	18126.002	833.0	0.000 ^b
Residual	1673.415	77	21.733		
Total	19799.418	78			
$\alpha = 0.05$					

Result presented in table 5 revealed an F-ratio of 18126.002 and associated probability value of 0.000^b. In determining the significance of the test, the probability values of 0.000 was compared against 0.05 apriori constant. The comparison revealed that there was a significant relationship. This means that the null hypothesis was rejected. Therefore, statistical inference was drawn that, “there was a significant relationship between academic achievement score of female students in Biology SSCE and Biology teachers' curriculum implementation strategies”.

Discussion of the findings

The results of the study revealed that in SSCE in Biology, male students had a high mean of 68.66 and less standard deviation of 10.87 than female students who had a low mean of 50.73 and high standard deviation of 15.93. This explains that male students had higher achievement in Biology than female students. In a confirmatory hypothesis test, the study revealed that there was a significant difference in the academic achievement of male and female students in Biology. This results therefore agreed with the findings of Ramdani, et al, (2021) who found out that female students usually fail in sciences especially in Biology because of their unfriendliness with science subjects. The results also support the findings of Ackerman, Kanfer, and Beier, (2013) who found that the vastness and complex terminologies of Biology have

This means that the null hypothesis was rejected. Therefore, statistical inference was drawn that, “there was a significant relationship between academic achievement score of male students in Biology SSCE and Biology teachers' curriculum implementation strategies”.

made female students to fail below the achievement of male students in certificate examinations. However, the results on the contrary oppose the findings of Grunspan, et al (2016) who posited that female students are better achievers in sciences especially in the aspect of life sciences, of which Biology is a core life science subject in secondary schools. The researchers therefore give a probable explanation for this result, positing that the significant variation in male and female Biology students' academic achievement could be due to stereotypic believe of female students, that male students do academically better in science subjects than female students. The Biology teachers may have given preferential treatment to male students considering the misconstrued role of male in the society, thereby laying strong foundations for them to perform better than female students in Biology. This could discourage female students from having interest in sciences and Biology in particular. Another reason for this variation could be that the objectives of Biology as written in the Biology curriculum were not covered in schools. This however, didn't prepare students well for the learning of Biology, especially the female students who may not have time to attend extra school classes like male students, due to home chores/domestic engagements. Failure of female students in Biology could be due to their socio-economic background. Some of the female

students miss classes to hawk goods on the street in order to feed. Others are kept at home due to unwanted pregnancy and sexually transmitted diseases (STD). This could prevent them from attending to classes unlike male students, thereby encourages low academic achievement among female students.

The findings of this investigation revealed a moderate and positive relationship between male students' academic achievement in SSCE Biology and Biology teacher's curriculum implementation strategies. This signifies that teachers' strategies used in teaching Biology contributes to students' academic achievement. The teacher's strategies accounted for 20.5% of male student's academic achievement in Biology in this study. However, this investigation revealed that there was a significant relationship between academic achievement score of male students in Biology SSCE and Biology teachers' curriculum implementation strategies.

The result of this investigation corroborates with the study of Okeke, (2024) who posited that a high relationship exists between what teacher does in teaching and students' academic achievement. The result also agrees with Assem, Nartey, Appiah, and Aidoo, (2023) who asserted that teachers teaching activities account very much in the student's performance. In addition, the result of this investigation is in disagreement with the findings of Antony and Elangkumaran, (2020) who stated that, students' academic achievement in science classes was not related to teacher's method of teaching. Further, the result of this investigation is in contrast with the study of Gajic, et al, (2021) and Caballé, Xhafa, and Barolli, (2010), who posited that students can learn Biological concepts through group reading among peers, and that teachers' activities in Biology class has little or no relationship with student's academic achievement in Biology.

This shows that, where students' academic success depends on so many factors, teachers teaching strategy is significantly paramount. What teachers do in the classroom, the teachers' activities, lesson plan, classroom assessment techniques adopted, teaching methods used, teaching aids and instructional materials used are important. Academic achievement of students in Biology is significantly related to

teachers teaching/implementation strategies which is in line with the social learning theory of Albert Bandura 1976. Learning which is evident in students' academic achievement cannot be effectively achieved without proper curriculum implementation. Therefore, curriculum implementation that is biased and lack in credibility to accommodate both student gender could influence male and female students differently; positively or negatively.

The findings of this investigation revealed a high positive relationship between female students' academic achievement in SSCE Biology and Biology teacher's curriculum implementation strategies. This signifies that teachers' strategies used in teaching Biology contributes to students' academic achievement. The teacher's strategies accounted for 91.5% of female student's academic achievement in Biology in this study. Other variables accounted for 8.5% of female academic achievement in Biology. This percentage was high compare to 20.5% contribution of the strategies in the performance male students. However, this investigation revealed that there was a significant relationship between academic achievement score of male students in Biology SSCE and Biology teachers' curriculum implementation strategies.

The result agrees with Assem, Nartey, Appiah, and Aidoo, (2023) who asserted that teachers teaching methods accounts very much in the student's performance especially in summative type of examination. In addition, the result of this investigation is in disagreement with the findings of Caballé, Xhafa, and Barolli, (2010), who posited that students can learn Biological concepts through group reading among peers, use of ICT facilities, and that teachers' activities in Biology class has little or no relationship with student's academic achievement in Biology.

This shows that, where students' academic success depends on so many factors, teachers teaching strategy is significantly paramount. What teachers do in the classroom, the teachers' activities, lesson plan, classroom assessment techniques adopted, teaching methods used, teaching aids and instructional materials used are important. Academic achievement of students in Biology is significantly related to teachers teaching/implementation strategies

which is in line with the social learning theory (Zhu, Wang, Cai, & Engels, 2013). Learning which is evident in students' academic achievement cannot be effectively achieved without proper curriculum implementation. Therefore, when teachers teaching approach as a way of implementing curriculum becomes biased and lack in credibility, it will be difficult to accommodate both student gender to meet their potential needs to succeed. Behavioural and managerial approach of Biology teachers are *sin qua non* to effective Biology curriculum implementation and students learning.

Conclusion

The following conclusions were drawn owing to the results of this investigation. There was a mean difference in the academic achievement of male and female students in SSCE Biology. However, this difference is significant.

It is pertinent to note that Biology teacher's curriculum implementation strategies was perceived to have contributed 20.5% to the academic achievement of male students in Biology in SSCE. This signifies that there is a significant but moderate relationship between male students' academic achievement in Biology and Biology teachers' curriculum implementation strategies. However, a significant but very high relationship of 91.5% exists between female students' academic achievement in Biology and Biology teachers' curriculum implementation strategies. Therefore, this study concludes that male students' academic achievement in Biology is better than

females' students' academic achievement in Biology.

Finally, the researchers concluded owing to the result of this investigation that Biology teacher's curriculum implementation strategies (lesson plans and notes, teaching methods, teaching styles and leadership, use of teaching aids etc) contributes to students' academic achievements in both male and female students. Biology teacher's curriculum implementation strategies has to be given attention, especially as it highly relates and influences female students' academic achievement in the Biology subject in Senior Secondary Schools Certificate Examinations.

Recommendations

The researchers recommended that school administrators should organise an academic support programs, particularly for female students in order to bridge the significant achievement gap, thereby ensuring equal learning opportunities and performance outcomes for female students in Biology.

Biology teachers should adopt and consistently apply effective curriculum implementation strategies that enhance male and female students' engagement and comprehension, ensuring equitable academic achievement in Biology.

The researchers recommended that Biology teachers should be given training on professional development programs for effective curriculum implementation strategies to further enhance male and female students' academic achievement in Biology.

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Implementation of Entrepreneurship Education Curriculum at Tertiary Institution levels.

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Abstract

This paper investigates the implementation of Entrepreneurship Education Curriculum at the Tertiary Institution levels. It tends to discuss the need for implementation of Entrepreneurship education at the tertiary institution levels. Curriculum is the total work to be done in a particular class or grade and beyond the classroom. Entrepreneur is described as an individual who engages in risk taking of starting a business, finance the business, work hard to sustain the business and finally maximize profit. Entrepreneurship education is the teaching and training given to students and would-be business men, the essential skills required to build viable enterprises, equipping the trainees with skills needed for taking responsibilities and developing initiative of the prospective trainees. Entrepreneurship Education Curriculum is described as a course or programme prepared to inculcate in students the needed ability and competency for effective performance both for their own immediate benefit and societal development. The role of Entrepreneurship in Youth Empowerment for Sustainable Development, the Challenges and implications of Implementation of Entrepreneurship Education Curriculum at Tertiary Institution Levels with recommendations where the administrators of tertiary institutions should ensure the adequate provision of instructional materials necessary for the implementation of entrepreneurship education curriculum in their institutions, the lecturers teaching entrepreneurship education in the tertiary institutions should be encouraged and trained to adopt various teaching methods to ensure proper implementation of the entrepreneurship education curriculum and so on were considered in this study.

Keywords: Curriculum, Curriculum Implementation, Entrepreneurship, Entrepreneur, Entrepreneurship Education, Entrepreneurship Education Curriculum.

Introduction

Entrepreneurship emerged due to economic and social challenges experienced daily in the society, especially the Nigerian society where unemployment is the order of the day. There is little or no understanding on how to pilot a business or enterprise. As a result, it becomes imperative to educate individuals especially youngsters in schools on how to carry on entrepreneurial desires.

Hence, the need for Entrepreneurship Education. Entrepreneurship education is embedded in the curriculum considering the philosophy and goals of education in Nigeria. According to Federal Republic of Nigeria (FRN) on National Policy on Education and Major Reforms and Innovations recently introduced into the Nigerian Educational System (2013. 6); the five main national goals of Nigeria which have been endorsed as the necessary foundation for the National Policy on education, are the building of; A free and democratic society, A just and

egalitarian society, A united, strong and self-reliant nation, A great and dynamic economy, and A land full of bright opportunities for all citizens.

While the Nigeria's philosophy of education is based on:

- The development of the individual into a sound and effective citizen
- The full integration of the individual into the community; and
- The provision of equal access to educational opportunities for all citizens of the country at the primary, secondary and tertiary levels both inside and outside the formal school system.

In line with the above goals and philosophy of Nigerian education, it becomes imperative that entrepreneurship should be properly implemented in tertiary institutions to aid societal sustainability.

Curriculum

Education is a tool for societal growth and development. It comprises of all series of instruction and discipline which is intended to enlighten the understanding, correct the temper and form the manners and habits of youths and fit them for usefulness in their future stations (Duru, 2016). Education describes the total process of human learning by which knowledge is imparted, faculties trained and skills developed. The society depends on education for developing and training her citizens. The society also depends on education for achieving its needs, aspirations and values.

According to Fafunwa (1974) in Duru (2016); the term curriculum can be said to be the total environment in which learning takes place. This implies that curriculum is the total work to be done in a particular class or grade and beyond the classroom. He believes that the objectives of African Education are to produce an individual who is honest, respectful, skilled, co-operative and conforming to the social order of the day. According to Lawrence and Maphalala (2021), curriculum is an organized learner interaction with pedagogical content and practices evaluating proposed educational objectives. This explains that curriculum facilitates meaningful

learning experience and achieving specific educational goals. It is a plan of study that is organized for learners to learn within a given period of time in order to achieve educational goals.

Curriculum Implementation

Curriculum implementation is the actual execution of document in the classroom through effective interactions of the teacher, learners and other elements in the instructional system. (Duru, 2016). According to Heloise and Sylvan (2021), curriculum implementation is the process of putting a designed curriculum into action in educational settings. It involves helping learners to acquire knowledge, skills, ideas and attitudes needed in life situations.

The definitions above implied that curriculum implementation is the processing or executing stage of the planned curriculum which falls directly in the hands of those involved in the implementation that is the classroom teachers. As there are many teachers, so will there be implementations of the planned curriculum.

Curriculum implementation is not what should be hurried over. It requires a careful study, training and retraining to ensure that teachers are in constant touch with adequate curriculum implementation processes. The curriculum implementation process ensures that the classroom teacher understands in every clear term the following; the syllabus, the scheme of work, units of plan, lesson plan and their effective usage. It also ensures that the classroom teacher adopts the appropriate teaching methods and materials to guide the students' learning, being knowledgeable in lesson note writing and above all has a good knowledge of the student he or she is teaching.

In all successful curriculum development and implementation, the teacher is the crucial element. This is because every teacher has a way, he or she prepares his or her lesson and delivers it. In this regard, curriculum planning and development are being directed to individual teachers. Teachers have some degree of responsibility which they must accept for their own professional work and their

consequent need for the kind of understanding of curriculum generally. (Duru, 2016).

Entrepreneurship

Entrepreneurship can be defined by describing what entrepreneurs do. For example: Entrepreneurs use personal initiative, and engage in calculated risk-taking, to create new business ventures by raising resources to apply innovative ideas that solve problems, meet challenges, or satisfy the needs of a clearly defined market (assignmentpoint.com, 2020). This implies that entrepreneurship is not restricted to business and profit, it is a process of creating something new.

Ikeme and Onu (2007) in Obunadike and Ughamadu (2014) defined entrepreneurship as the use of human courage to seek investment opportunities and establish a profit-oriented enterprise. It is the willingness and ability of an individual to seek out investment in an environment and be able to establish and run an enterprise successfully based on identified opportunities. It is worthy of note that entrepreneurship is all about the willingness and the risk-taking attitude that is demonstrated in a creative performance.

In the words of Paul (2005) in Okeke and Okorie (2014); entrepreneurship is the willingness and ability of a person or a firm to see environmental changes as opportunities and use the factors of production to produce goods and services, it involves risking financial, material and human resources in a new business concept or an opportunity within an existing firm. It involves perception and identification of business opportunities, decision on the location of enterprise, response to an opportunity, risk bearing of all uninsurable risks and the management of the ongoing organization.

Entrepreneur

Entrepreneurs literarily are ‘undertakers’, ‘creators’ implying that entrepreneurs create jobs directly and indirectly both for himself/herself and people who are not really entrepreneurs. An entrepreneur is a person devoted to search for something new and exploit the novel notions and visions into gainful opportunities by bearing the risk involved in the

process. An entrepreneur conceives the idea of an enterprise, lives with it and finally establishes the enterprise (Dahr, 2020). Entrepreneurs are individuals who exhibit high commitment, creativity, innovation, independence and perseverance. These traits enable them to navigate challenges and achieve success (Priyadi and Mulyani, 2024).

The word entrepreneur originated from the French word ‘entrepredre’ meaning ‘to undertake.’ The coining of this word entrepreneur is credited to the French Economist called Jean-Baptist Say. Here, an entrepreneur is one who undertakes to sort out, control, manage and assume the risk of a business. This is an individual who organizes or operates a business or businesses.

The Oxford Learner's Dictionary defines an entrepreneur as a “person who makes money by starting or running businesses, especially when this involves taking financial risks.” Chrisman, Chua and Steier (2022) buttressed that entrepreneurs are individuals who develops something new by investing time and effort, taking financial risk and reaping independence and reward. This implies turning ideas into reality.

Entrepreneurship Education

Entrepreneurship education is a veritable instrument for national development, as it equips individuals with appropriate skills, knowledge, abilities and competence that will result to self-employment, self-reliance and thereby lead to sustainable economic growth and development. It is essential not only to shape the mindsets of young people, also to provide the skills and knowledge that are central to developing an entrepreneurial culture. Sreenivasan and Suresh (2023) said that entrepreneurship education aims at fostering an entrepreneurial mindset, teaching entrepreneurship and integrating innovation. This has to do with the learning of how to be creative, take risk and recognizing opportunities in the world of business.

According to Iturralde and Maseda (2018), entrepreneurship education is a pathway to improve the entrepreneurial orientation of students, enhancing their abilities to identify

opportunities, taking calculated risks and creating values. Therefore, it is the education that gives students the opportunity to acquire skills, knowledge, assets that result in happiness, fulfillment and gives comfortable and better placement financially and socially in his/her immediate environment and the society as a whole.

Entrepreneurship education is a collection of formalized teaching that trains, informs, prepares and educates anyone interested in business creation or business development. It is a form of training that will bring out the business ingenuity in the individual. It is not just for skill acquisition training programme as it is often misunderstood by people, it is an all fulfilling programme that brings out the potentials in the individual thereby making them productive citizens of a country.

Entrepreneurship Education Curriculum

Entrepreneurship Education curriculum is a set down course streamlined to inculcate in students the needed ability and competence for effective performance both for their own immediate benefit and societal development. Entrepreneurship education curriculum seeks to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in a variety of settings.

The entrepreneurship education curriculum has five components as cited in Federal Republic of Nigeria (FRN, 2013) enshrined in the National Policy on Education and Major Reforms and Innovations recently introduced into the Nigerian Educational System, with idea of meeting the need of higher education in Nigeria; these include; General Education, Theory and related courses, Workshop practices, Industrial training/Production work and Small business management and entrepreneurial training.

These curriculum components are required to meet with the standard all over the world. This is also a guide for which the students, teachers including educational stakeholders will duly follow to meet the economic development need of the society.

The following skills are acquired by students in tertiary institutions as they relate to entrepreneurship education: Tailoring, hairdressing, plumbing, marble works, printing, crop farming and livestock farming, publishing, bookbinding, computer application, shoemaking, dyeing of cloth, soap and pomade making.

Entrepreneurship education curriculum was established to meet the needs of the society, these needs are the benefits derived from entrepreneurship education which include;

- i. Equipping students with the needed skills to establish a knowledge base about functions and operations of business with relationship to business environment. This plays complementary role in developing knowledge, job skills and work experience among teachers and students
- ii. Offers opportunities to students for job experience and earning, saving and investing at an early stage of life than their peers.
- iii. Immense reduction of unemployment in the society to aid self-employment.
- iv. Proper utilization of local resources, decentralization and diversification of business.
- v. Promotion of science and technology, capital formation and promotion of entrepreneurship culture.

The Role of Entrepreneurship in Youth Empowerment for Sustainable Development

Entrepreneurship plays the following roles in the empowerment of the youth for sustainable development:

1. Preparation of individuals to meet the manpower needs of relevant occupation through acquisition of useful knowledge, skills and attitudes required in the field of work.
2. Elimination of poor attitude to work, low performance on the job and lack of job satisfaction as individuals will help to acquire the right attitude to work and respect for dignity of Labour.
3. Enhancing employment through self-reliance and self-employment as youths equip themselves with adequate knowledge,

skills and attitudes which make them more productive.

4. Reduction in professional and vocational abuse as skilled and unskilled are prevented from using other vocations as discovery grounds.

Challenges Facing Implementation of Entrepreneurship Education Curriculum in Tertiary Institution levels.

Despite the benefits of entrepreneurship curriculum, there are some problems hindering its full implementation in higher institution, they include;

- Poor funding of the entrepreneurship education programme.
- Poor economic planning and management.
- Inadequate technologically trained manpower. This implies, lack of entrepreneurship teachers, materials and equipment
- Poor quality of education
- Political instability
- Social, religious and cultural factors
- Poor training pattern of personnel (Teachers)
- Other challenges include:
- Improper and inadequate time allocation for the courses and practicals.
- Poor infrastructure, facilities and equipment for training, teaching and learning
- Non-inclusion of entrepreneurship programme in the school curriculum.
- Teachers available are drafted from other fields and faculties instead of industries and draft successful business personnel in the society to help in facilitating the programme.
- Unconducive teaching and learning environment.
- Insensitivity of government to enterprise creation and expansion strategy to suit the learnt skills.
- Isolation or pockets of ineffective programme and management incompetence.
- Poor funding of the programme
- Poor societal attitude to technical and vocational education development

Entrepreneurship Education Curriculum enhances self-employment, self-reliance and promotion of societal survival. There is need to supervise and evaluate the worth of the skills

and knowledge imparted to the students especially at the tertiary level. The required skills for entrepreneurship will be acquired by the students who will utilize the skills to meet their livelihood and the good of the society.

Entrepreneurship Education Curriculum is important and of great necessity in Tertiary Institutions because it will help to educate the individuals to a great extent, the need for self-employment and reliance also help in reduction of crime through effective engagement of the youngsters and as a result eliminate hunger and poverty. This implies that, when students are engaged in one form of trade or the other, with the aim of generating income, to be self-employed and probably employ others, the case of social vices like armed robbery, rape, political hooliganism, kidnappings and bandits in the state will be reduced or completely eliminated.

For this to be achieved there is need to consider the extent to which the implementation of entrepreneurship curriculum has helped in equipping the youths with the fundamental skills which result to self-employment, self-reliance and gainful employment. Entrepreneurship is the engine room for development and economic emancipation.

Implications of Implementation of Entrepreneurship Education Curriculum in Tertiary Institution levels.

The proper implementation of entrepreneurship education curriculum in tertiary institution levels can have the following implications as considered in this study:

- This will enable individuals to acquire and develop skills with entrepreneurial acumen which will aid innovation and creativity that will serve as a form of succor to the society.
- It will pave way for individuals to create job for themselves, making them self-employed after graduation through the skills acquired and creating job opportunities for other persons for their livelihood.
- It will aid economic growth as the graduates entrepreneurially developed will contribute immensely the wealth of knowledge garnered overtime in the course of study to better the lots of individuals and that of the society at large.

- It will reduce the rate of scouting for white collar job which are not readily available in the labour market and increase the rate of ingenuity in the graduates as they develop their skills on daily basis and as such lead to competition in the production and branding of products in the market.

Conclusion

This paper investigated Implementation of Entrepreneurship Education Curriculum at Tertiary Institution Levels. The literature reviewed discussed the major areas of the study with focus on Curriculum, Curriculum Implementation, Entrepreneurship, Entrepreneur, Entrepreneurship Education and Entrepreneurship Education Curriculum

The curriculum of entrepreneurship education is not properly implemented in tertiary institutions, this is because there are no adequate instructional materials, low financial resources, various and strategic methods of teaching are not adopted and the time allotted for practical is not enough. It is imperative to note that proper implementation of the entrepreneurship education curriculum in tertiary institutions will encourage growth and sustainable economy.

Recommendations

The following are the recommendations proffered for the study:

- The administrators of tertiary institutions in Imo State should ensure the adequate provision of instructional materials necessary for the implementation of entrepreneurship education curriculum in their institutions.
- The lecturers teaching entrepreneurship education in the tertiary institutions should be encouraged and trained to adopt various teaching methods to ensure proper implementation of the entrepreneurship education curriculum.
- Government at various levels should ensure adequate provision of funds to tertiary institutions specifically for the implementation of entrepreneurship education curriculum.
- The various faculty officers should ensure that enough time is allotted for the teaching and practicing of skills learnt in entrepreneurship education in the tertiary institutions.
- Enabling environment should be provided in the various tertiary institutions to make it easier for the lecturers teaching entrepreneurship education programmes to adapt and deliver properly

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Integration of Digital Assessment Techniques in Higher Education for Effective Curriculum Innovation in South Eastern Nigeria

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Abstract

The study investigated the Integration of Digital Assessment Techniques in Higher Education for Effective Curriculum Innovation in South Eastern Nigeria. Two research questions and two hypothesis guided the study. Quantitative survey research design was adopted for the study. Stratified random sampling technique was used to draw sample of 700_(100%) students and lecturers (400_(57.1%) students and 300_(42.9%) lecturers) from various institutions across south eastern Nigeria. Two researchers made instrument were used for the study. The instruments were titled; Digital Assessment Techniques Impact on Student Engagement and Learning Outcomes Questionnaire (DATISELOQ) and Perceptions of Lecturers on Effectiveness of Digital Assessment Techniques in Curriculum Innovation Questionnaire (PLEDATCIQ). Instruments was pilot tested and analysed using Cronbach alpha. The statistics yielded a reliability index of 0.86 and 0.78 as obtained for both respectively. Findings of the study reveal that digital assessment techniques have impacts in student engagement and learning outcomes in higher education institutions to a higher extent in South Eastern Nigeria. The study also reveals that the integration of digital assessment techniques can foster effective curriculum innovation in higher education institutions in South Eastern Nigeria. Among all recommendations, the researchers suggested that there should be implementation of comprehensive professional development programs to equip lecturers with the skills needed to effectively use digital assessment tools for effective curriculum innovation by organizing regular workshops, webinars, and training sessions focused on digital assessment techniques

Keywords: Digital Assessment Techniques, curriculum Innovation, Higher Education

Introduction

The theory and practice of teaching adult learners called andragogy usually in higher institutions of learning have significantly changed recently due to proliferation of technology in education. This change has been seen in the integration of digital assessment techniques, which have become a fulcrum upon which curriculum innovations moves. Digital assessments give a range of benefits which are not limited to immediate feedback, individualized learning experiences, and data driven insights that inform curriculum innovation. Therefore, integration of digital

assessment techniques in higher education andragogy becomes an action to study, assessing the impact of the technology on curriculum innovation and effectiveness.

Digital assessment techniques are those tools and approaches employed usually in institutions of learning to assess the extent to which students have acquired the educational objectives by means of technological devices. Chen, Jeng, Sun and Kaptur (2023) outlined that digital assessment techniques are computer-based tests, online quizzes, e-portfolios, digital simulations, automated essay scoring, computer-based testing

and computer-adaptive testing. Each of these techniques gives their peculiar benefits, making for a more dynamic and responsive educational environment. Online quizzes and survey are digital tools which give immediate or instantaneous feedback thereby assisting students find out areas for improvement quickly. They also allow educators employ these tools to monitor student progress and adjust instruction accordingly (Mahlawat, 2020).

Over time, students can showcase their learning outcomes/performance with e-portfolios. Thereby encouraging reflective learning and provide a detailed and all-encompassing understanding of student learning progress (Wolf, Dunlap & Stevens, 2012). Interactive tools such as digital simulations and games engage students in experiential learning, making complex concepts easily accessible and understandable (Asad, Naz Churi & Tahanzadeh, 2021). However, in automated essay scoring, the use of artificial intelligence provides quick and objective assessments of written assignments, helping to manage large volumes of student work (Owan, Abang, Idika, Etta & Bassey, 2023). Tailored assessment experience that can more accurately measure student abilities can be provided by adaptive testing, adjusting the difficulty of questions based on student performance (Gorgun & Bulut, 2023).

Therefore, it is imperative to understand that integration of digital assessment techniques has implications for curriculum innovation in higher education (Núñez-Canal, de Obesso & Pérez-Rivero, 2022). These digital assessment tools enhance a more individualized and flexible learning experience, supporting the development of curricula that are adaptive to student needs and learning styles. For instance, personalized learning leverages on these tools thereby allowing for the customization of learning experiences, ensuring that students receive the appropriate level of challenge and support. This individualization encourages deeper engagement and better learning outcomes across different levels of education (Alamri, Watson & Watson, 2021). Digital assessment provides data which gives valuable insight into the learning patterns and outcomes of a student. Burleigh, et al (2023) stated that academic/faculty staff of higher education institutions can use such data to refine

curricula, identify gaps in instruction, and implement targeted interventions. It is proven that students can have self-regulated learning and continuous improvement which is encouraged by immediate and detailed feedback from digital assessments techniques. Activity of these techniques can assist students to understand their strengths and weaknesses (Mejeh, Sarbach, & Hascher, 2024).

Despite high significance of digital assessment techniques in higher education andragogy, its effectiveness in curriculum innovation remains modest. Devastating factors such as insufficient technological infrastructure has hampered the beneficial effect of digital assessment in higher education. Núñez-Canal, de Obesso and Pérez-Rivero, (2022) revealed that institutions of higher learning especially in developing regions, lack the necessary digital tools and resources for effective teaching and learning. Due to lack of training, many lecturers inadequately make use of these insufficient digital assessment tools. Dumbiri and Nwadiani, (2020) mentioned that developing countries like Nigeria have many lecturers and teachers who lack the technical know-how to implement these digital assessment tools effectively. However, for these tools to bring an innovation in Nigerian curriculum, they need to be infused/integrated into the curriculum designing procedures from the beginning. It means these tools must align with the curriculum. But in Nigeria, the integration of these important digital assessment tools remains superficial which limits their latent impact (Raji, 2023).

Statement of the Problem

South Eastern Nigeria among other regions of the country is populated with many institutions of higher learning/education. Such as universities, polytechnics, and colleges of education. These institutions have insufficient technological tools and teachers with little or no knowledge on the technical know-how. Despite the fact that there are many educational institutions in south eastern Nigeria, yet implementation of digital assessment techniques or tools remains unachievable where institutions resorted to analogue paper and pen testing (Ezumah, 2020). This is due to insufficient technological tools such as computers, internet access, and other digital tools necessary for implementing digital assessments effectively (Onyema, 2020). Lack of technical know-how

has been identified to have created significant gap in the technical knowledge needed to design, implement, and maintain digital assessment systems. This lacuna affects both lecturers and school administration (Okoye & Pillay, 2022). Again, issues bordering implementation of digital assessment for effective curriculum innovation is funds. This a major barrier hindering many institutions of higher learning. However, accessing funding for technological advancements in higher education and to invest in digital assessment tools is a struggle peculiar to many educational institutions in Nigeria (Rodríguez-Abitia, Martínez-Pérez, Ramirez-Montoya, & Lopez-Caudana, 2020).

Against these backdrops the researchers considered it pertinent at this material time to evaluate digital assessment techniques Integration in Higher Education for Effective Curriculum Innovation in the South Eastern Nigeria. This is due to the fact that higher education continues to change, therefore, strategic implementation of digital assessments will play a crucial role in shaping the future of curriculum design and delivery.

Research Purposes

Specifically, this study determined,

- 1.The extent to which digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria
- 2.The perceptions of lecturers regarding the effectiveness of digital assessment techniques in curriculum innovation in higher education institutions in South Eastern Nigeria

Research Questions

- To what extent do digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria?
- What are the perceptions of lecturers regarding the effectiveness of digital assessment techniques in curriculum innovation in higher education institutions in South Eastern Nigeria?

Hypothesis

H₀₁: There is no significant difference in the mean response of students from higher

education institutions on the extent digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria
H₀₂: There is no significant difference in the mean response of lecturers on the perception of digital assessment techniques as effective tools for driving curriculum innovation and enhancing instructional practices in South Eastern Nigeria

Method

Descriptive survey research design was adopted for the study to collect and analyze data. The method was appropriate because it allows for the measurement and analysis of numerical data and it gives room to get detailed information on the impact and perceptions associated with digital assessment techniques in higher education.

The study was carried out in the south eastern Nigeria, which is a region with five state. These states are Imo, Abia, Anambra, Enugu, and Ebonyi states. Each of these states has federal institutions of higher learning. The study population consists of all students and lecturers from federal institutions in the South Eastern Nigeria, estimated to be approximately 116, 400, (93,143 Students and 24,257 Lecturers). Cluster random sampling technique was employed to ascertain inclusivity of staff and students in the federal institutions in South East Nigeria into the sample for true representation. The sample of the study consisted of 700_(100%) students and lecturers, drawn from the estimated population. 400_(57.1%) students and 300_(42.9%) lecturers were selected randomly from various federal institutions across south eastern Nigeria. Randomly, 219_(54.7%) university students, 84_(21%) polytechnic students, 97_(24.3%) college of education students and 114_(38%) university lecturers, 87_(29%) polytechnic lecturers, 99_(33%) college of education lecturers who responded to the instrument constituted the sample respectively.

Four-point likert scale (1 = Very Low Extent to 4 = Very High Extent for students and 1 = Strongly Disagree to 4 = Strongly Agree for lecturers) questionnaires were developed using surveyheart app by the researchers for students and lecturers. Both lecturers and students' questionnaires titled; Digital Assessment Techniques Impact on Student Engagement and

Learning Outcomes Questionnaire (DATISELOQ) and Perceptions of Lecturers on Effectiveness of Digital Assessment Techniques in Curriculum Innovation Questionnaire (PLEDATCIQ) consists of ten item statements each, giving a total of 20 items. The students' questionnaire consists of items on their demographic information, engagement levels, and learning outcomes. However, the lecturers' questionnaire contains items on lecturers' demographic information and perceptions of the effectiveness of digital assessment techniques in curriculum innovation.

The questionnaires were pilot-tested with a small group of 18 students and 16 lecturers to ensure clarity and reliability. The data generated were coded and analyzed with cronbachs' alpha yielding reliability coefficients of 0.86 and 0.78, these ascertain the appropriateness of the

instruments. The questionnaires were administered electronically via e-mail, whatsapp and in paper form to the targeted sample. One month was given to the respondents to complete and return the questionnaires. The researcher's followed up respondents to maximize response and return rates. Mean and standard deviation were used to answer research questions. Analysis of variance (ANOVA) was used to test the hypothesis against ≤ 0.05 level of significance.

Respondents were intimated with the objectives of the study, their right to withdraw at any time, and were assured of keeping their records confidential. Therefore, all data collected from the participants were kept confidential and used solely for the purposes of this study. Information that will lead to identification of an individual was removed from the dataset.

Result

Research Question 1: To what extent do digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria?

Table 1: Mean response score on extent digital assessment techniques impact students engagement and learning outcomes in higher education institutions in South Eastern Nigeria

S/N	ITEM STATEMENT	X	SD
1.	Digital assessments can enhance students engagement with course materials	3.58	.49
2.	Students feel more motivated to participate in online discussions and activities when digital assessments are used	3.61	.56
3.	Digital assessment techniques can improved students overall academic performance	3.62	.53
4.	Students find digital assessments to be a more flexible and convenient approach compared to traditional assessments	3.57	.50
5.	Digital assessments has increased students interaction with instructors and peers	3.59	.51
6.	Students are more likely to complete assignments and projects on time when digital assessment methods are utilized	3.58	.50
7.	Digital assessments provide timely feedback that helps in understanding students strengths and weaknesses	3.59	.49
8.	The variety of digital assessment tools (e.g., quizzes, forums, assignments) keeps one interested in the course content	3.59	.52
9.	Students feel that digital assessments accurately reflect students understanding and learning of the course material	3.63	.50
10.	Digital assessments contribute to students development of critical thinking and problem-solving skills	3.59	.49
Average Mean Total		3.59	.22
N=400 _{(57.1%); (UNIVERSITIES, POLYTECHNICS, & COLLEGES OF EDUCATION STUDENTS)}			

Table 1 reveals the mean response scores on the extent digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria. Items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 have mean scores within the range of 3.00 – 4.00 above 2.50 benchmark which signifies high acceptance of the statements. This implies that digital assessment techniques have impacts in student engagement and learning outcomes in higher education institutions to a higher extent in South Eastern Nigeria. This table also reveals average mean total of 3.59 ± 0.22 which shows that students in higher education institutions in in South Eastern Nigeria accepted to a high extent that digital assessment techniques assist them to engage in learning and have improved performance. Students accept to a high extent that digital assessments are more flexible and convenient compared to traditional assessments because they provide timely feedback that helps in understanding students strengths and weaknesses. Again, this study revealed variety of digital assessment tools (e.g., quizzes, forums, assignments) accepted by students which keeps one interest in the course content etc. The researchers went further to test hypothesis 1 to compare difference in the response of students in higher education institutions in South Eastern Nigeria.

Research Question 2: What are the perceptions of lecturers regarding the effectiveness of digital assessment techniques in curriculum innovation in higher education institutions in South Eastern Nigeria?

Table 2: Mean response score on the perceptions of lecturers regarding the effectiveness of digital assessment techniques in curriculum innovation in higher education institutions in South Eastern Nigeria

S/N	ITEM STATEMENT	X	SD
1.	Lecturers believe that digital assessments contribute to curriculum innovation	3.64	.49
2.	Digital assessment techniques have made it easier to track student progress and performance	3.56	.52
3.	The integration of these tools can improved the overall quality of my teaching	3.59	.52
4.	Using digital assessments can streamlined the grading process and reduced administrative workload	3.56	.49
5.	I perceive digital assessments as an effective means to adapt the curriculum to meet students' diverse learning needs	3.57	.49
6.	Digital assessment tools can provide more diverse ways to evaluate student learning	3.54	.51
7.	Digital assessments can enable me to give more detailed and constructive feedback to students	3.62	.52
8.	I feel that digital assessments can encourage students to engage more deeply with the course content	3.64	.47
9.	Digital assessments have allowed me to implement more creative and interactive teaching strategies	3.56	.49
10.	The use of digital assessments can facilitated better communication and collaboration among students	3.59	.49
AVERAGE MEAN TOTAL		3.59	.22
N=300 (42.9%); (UNIVERSITIES, POLYTECHNICS, & COLLEGES OF EDUCATION LECTURERS)			

Table 3 reveals the mean response score on the perceptions of lecturers regarding the effectiveness of digital assessment techniques in curriculum innovation in higher education

institutions in South Eastern Nigeria. Items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 have mean scores within the range of 3.00 – 4.00 above 2.50 benchmark which signifies high acceptance of statements.

This table reveals average mean total of 3.59 ± 0.22 which shows that lecturers perceive in their opinion that integration of digital assessment techniques can foster effective curriculum innovation in higher education institutions in South Eastern Nigeria. This is evidently concretized on the fact revealed in the table above on lecturers' agreement to very high extent that; digital assessments techniques contribute to curriculum innovation as it makes it easier to track student progress and performance. The study again reveals that the integration of these assessment techniques can improved the overall quality of lecturers teaching and can assist lecturers to streamline the grading process and reduced administrative workload.

Evidence in this study has shown that; lecturers perceive digital assessments as an effective means to adapt the curriculum to meet students' diverse learning needs by allowing them to implement more creative and interactive teaching strategies as well as encouragement of better communication and collaboration among students. Finally, digital assessments techniques can enable lecturers to give more detailed and constructive feedback to students which improves teaching and learning. The researchers went further to test hypothesis to compare difference in the response of mean response of lecturers on the perception of digital assessment techniques in higher education institutions in South Eastern Nigeria.

Table 3: ANOVA table on mean response of students from higher education institutions on the extent digital assessment techniques impact student engagement and learning outcomes in higher education institutions in South Eastern Nigeria

Sources	Sum of Squares	df	Mean Square	F	Sig.
Between Group	2.481	2	1.240	.253	.777
Within Group	1947.429	397	4.905		
Total	1949.910	399			
$\alpha \leq 0.05$					

Table 2 above is ANOVA table which reveals F-value of .253, degree of freedom 2 and significant value of 0.777. Since the significant value of 0.777 is above the 0.05 level of significance at which the null hypothesis was tested, the null hypothesis of this study is, therefore, accepted. Implication of the statistics is that there is no significant difference in the mean response scores of students from higher education institutions on the extent digital assessment techniques impact student engagement and learning outcomes in higher

education institutions. This study therefore shows that selected students in the higher education institutions in South Eastern Nigeria do not have different opinion on digital assessments techniques enhancement of; students' engagement with course materials, students' interaction with instructors and peers, provision of timely feedback that helps in understanding students' strengths and weaknesses, and improvement of students overall academic performance.

H₀₂: There is no significant difference in the mean response of lecturers on the perception of digital assessment techniques as effective tools for driving curriculum innovation and enhancing instructional practices in south eastern Nigeria higher education institutions

Table 4: ANOVA table on the mean response of lecturers on the perception of digital assessment techniques as effective tools for driving curriculum innovation and enhancing instructional practices in south eastern Nigeria higher education institutions

Sources	Sum of Squares	df	Mean Square	F	Sig.
Between Group	4.521	2	2.260	.453	.636
Within Group	1481.676	297	4.989		
Total	1486.197	299			
$\alpha \leq 0.05$					

Table 2 above is ANOVA table which reveals F-value of .453, degree of freedom 2 and significant value of 0.636. Since the significant value of 0.636 is above the 0.05 level of significance at which the null hypothesis was tested, the null hypothesis of this study is, therefore, accepted. Implication of the statistics is that there is no significant difference in the mean response score of lecturers on the perception of digital assessment techniques as effective tools for driving curriculum innovation and enhancing instructional practices in south eastern Nigeria higher education institutions. This study therefore shows that lecturers in the higher education institutions in South Eastern Nigeria do not have different opinion on digital assessment techniques as effective tools for driving curriculum innovation and enhancing instructional practices.

Discussion

The findings of this study reveal that digital assessment techniques have impacts in student engagement and learning outcomes in higher education institutions to a higher extent in South Eastern Nigeria. These techniques assist them to engage in learning and have improved performance because of its flexibility and convenience compared to traditional assessments. Such flexibility as provision of timely feedback that helps in understanding students' strengths and weaknesses. The study further revealed that digital assessment techniques keep students interest in the course content. The above finding is in line with the study of Meje,

Sarbach, and Hascher, (2024) who revealed that activity of digital assessment techniques can assist students to understand their strengths and weaknesses. It also supports Wolf, Dunlap and Stevens, (2012) who opined that digital assessment techniques encourage reflective learning and provide a detailed and all-encompassing understanding of student learning progress. Asad, Naz Churi and Tahanzadeh, (2021) view on simulations and games engaging students in experiential learning, making complex concepts easily accessible and understandable is also in line with the findings of this study. Despite the variation in structure and programmes of different higher education institutions in Nigeria, there is a unanimous agreement that digital assessment techniques have impacts in student engagement and learning outcomes in higher education institutions to a higher extent in South Eastern Nigeria. The above assertion concurs with Alamri, Watson and Watson, (2021) whose findings shows digital assessment techniques practices fosters deeper engagement and better learning outcomes across different levels of education.

However, finding of this study reveals that the integration of digital assessment techniques can foster effective curriculum innovation in higher education institutions in South Eastern Nigeria. Digital assessments techniques contribute to curriculum innovation as it makes it easier to track student progress and performance. The study of Núñez-Canal, de Obesso and Pérez-

Rivero, (2022) agree with the present study in which they posited that integration of digital assessment techniques has implications for curriculum innovation in higher education. Burleigh, et al (2023) stated that academic/faculty staff of higher education institutions can use such data to refine curricula, identify gaps in instruction, and implement targeted interventions. The above study is in line with the present study. Therefore, digital assessment techniques enhance students' engagement and learning outcome as well as foster effective curriculum innovation in higher education institutions as supported by literature.

Conclusion

In this study, both lecturers and students have demonstrated that digital assessment techniques are vital to students' engagement for effective learning and learning outcomes as well as effective curriculum innovation and implementation. This era of proliferation in technology including the surging Artificial intelligence technology, higher education institutions need to introduce an assessment that system that meets the demands of the time which involves digital assessment techniques. This study has extensively studied both students and lecturers in the South Eastern Nigeria, perhaps their opinion may vary with students and lecturers in other part of Nigeria. Therefore, other researchers can

assess the integration of digital assessment techniques in higher education for effective curriculum innovation in other region in Nigeria.

Recommendation

Based on the finding the following recommendations were made;

1. Ministry of educations through the school management should invest in the development of robust digital assessment tools and ensure widespread access to technology by providing high-speed internet access and necessary digital devices to students. Again, establish partnerships with tech companies to supply affordable devices and software, and to set up dedicated IT support teams to maintain and troubleshoot digital systems.
2. There should be implementation of comprehensive professional development programs to equip lecturers with the skills needed to effectively use digital assessment tools by organizing regular workshops, webinars, and training sessions focused on digital assessment techniques. Further, encourage peer mentoring and collaborative learning among lecturers to share best practices and innovative approaches as well provide incentives and recognition for educators who successfully integrate digital assessments into their teaching practices.

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Investigative Study of E-learning Application in Post- Basic Public Schools in imo state.

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Abstract

The paper investigated e-learning application in post-basic public schools in Imo State using Owerri Education Zone 1 as a case study. It expresses the need to migrate into the child-friendly, child-centered, digitized, constructivistic and technology driven e-learning pedagogy which is the prevailing global heartbeat as against the conventional pedagogical practice. The target population was 792 teachers. The sample size was 266 respondents sampled through proportionate, stratified, simple random sampling techniques. The researchers designed a structured research instrument (Questionnaire on e-learning Application for Post-basic Education - QEAPe) validated by two experts in measurement and evaluation, and Curriculum/Instruction. A reliability index of $r = 0.82$ was obtained using Pearson's Product Moment correlations statistics and data analysis was done using mean ($\bar{x}$) and standard deviation (SD). Findings from the study revealed that teachers of public schools deliver their lessons through conventional strategies and there is poor funding, lack of ICT resources and professionals in schools. Recommendations were offered among which are: that government should fund education, install e-learning facilities in schools, provide computers, e-libraries and enforce their utilization.

Keywords: Constructivism, e-learning, e-resources, information communication technology, traditional teaching and learning activities.

Introduction

Education is one dynamic activity that transforms man and the society. The desire of any state is to sufficiently dispense what can be described as utilitarian education and education for self-development. The one relates to practical education that inculcates skills and entrepreneurial industry while the other relates to self-orientation and the organization of an individual's life inter-alia. The utilitarian value of education is such that even the means and tools to it are painstakingly considered.

Each human epoch has appropriated to itself a way of educating its youths. Before the 21st century, learners have been taught using the traditional teaching-learning activities which are

teacher- Centred (Obilo, 2017; Udechukwu 2025). Traditional ways of teaching allowed the learner to depend wholly on what the teacher knew, could reveal and present. The teacher was a reservoir and intellectual tank. Learners were dependent, passive and tied to the capacity, interest and needs of the teacher. There were no many ways of obtaining information or getting educated than by the teacher. Although there were other communication media and prevailing technologies, they were not considerably employed for teaching-learning purposes.

The non-employment of cutting-edge technologies in educational industry made the process of teaching and learning drab and dry, a herculean task, a frustrating experience, abstract

venture and discouraging activity to be engaged in (Ike, Iwu & Onwuagboke, 2015). Technology in education manifested in areas of teaching aids and some conventional teaching-learning materials such as chalkboards, pens, rules, papers, chalk, ink, books, etc. Under the traditional dispensation, means to knowledge and information were gagged, censored and regulated. Learners were not at liberty to obtain information from channels not approved by school and the teacher. This limited eccentricism, innovation, knowledge reconstruction, learners' preferences and active participation in the learning process.

However, the 21st century brought with it radical transformation that changed the visage, pattern and strategies of teaching and learning. It placed the learner at the front burner of the educational process. Learners' interests, needs, perception, ego-involvement and opportunity to manipulate the learning process came to be allowed and prioritized (Iwuamadi, 2020).

Technologies were brought to bear in educational processes and activities which not only dispose the child to observe, explore listen, reason and question but also to utilize, operate and manipulate both the process of teaching – learning and the available technologies. Learning therefore becomes an individual effort towards knowledge and skills acquisition as well as reconstruction of knowledge with others. To this end, the teacher diminishes as the purveyor of knowledge. Teaching-learning process assumes a community, societal and global posture where everyone including the learner collaboratively contributes to learning dynamics. These therefore, necessitate the employment of varying technologies in the educative processes. This provides a transactional pedagogy (rather than a transmissional pedagogy). This constructivism as advocated by Lev Vygotsky (1897 – 1934) and supported by Brunner recognizes the influence of the teacher, language, environment of the learner, his social setting and group interaction. This is what Adiaha, Ifegbo and Umune (2023:3) referred to as “the globalization of education” which according to them “has already necessitated the application of digital technologies”.

Constructivism practically engages the five sensory organs in the learning process. This in turn stimulates the learner, encourages his ego-involvement, perfects his learning experience and assists him in knowledge, reconstruction. Indulgence in constructivistic approach makes teaching and learning a social burden being characterized by group interaction or inter-personal engagements, collaboration, cooperation and communicative exchanges. To this end, the common constructivist strategies to drive the new paradigm shift are the adoption and application of technology in education processes. Espousing this notion, Onwuagboke (2025), maintains that it gives students access to a wealth of information and resources to develop essential skills and prepare them for the digital world.

Some of these technologies in education that are learner – centric include: radio, television, computer, telecommunication, internet, teleconferencing, satellite dishes, global system mobile (GSM), virtual library, email, world wide web, online learning, video, smart board, disks, power point, instant messaging (IM) and many more (Egbule, 2015). Ike (2025) however, classified them into hard -ware and software technologies such as the internet which provides electronic mail (Email). Newsgroup, file transfer protocol (FTP) and world wide web (www) services. The ICT equally aids in the service of tele-conferencing, tele - processing, desktop video conferencing, instant messaging, Chartroom and list server. These transmissible data and information are managed, controlled and sustained to the ICT equipment where the computer and smart phones play vital roles are called E- technologies. E- technologies as applied in teaching and learning giving rise to E-learning which is the prevailing rubric for constructivism.

According to Iwuamadi (2020), learning is enhanced by the use of ICT for information sharing globally. E- learning leverages on the dynamics of communications technology. The use of ICT in the classroom addresses learners' individual abilities and learning pace. Digital classrooms therefore, are designed by using electronic devices and other platforms like the social media, multimedia, and mobile phones to

teach learner for improved learning outcomes (Adiaha, Ifegbo & Umune, 2023).

Justifying the reality of E- learning, Oxford Languages(2024) defines electronic or virtual learning as a process through which learning is acquired by digital media and technologies; a process by which learner can access their course materials whenever they want. Clover (2017), affirming this explains that web- based learning which is commonly regarded as e- learning or online learning assists the learner in retrieving live and recorded information aimed at supporting their learning.

There are two primary types of E- learning viz computer- based e- learning and Internet- based e- learning where a technical distinction is made between e- learning and online learning. On a general standpoint, there appears to be ten (10) different types of e- learning.

- Computer Managed Learning (CML) otherwise called computer managed Instruction (CMI). Although not online device, computer is used to assess learning process. It operates through Information databases. The database has Information a learner has to learn which concedes certain individual considerations to the learner and has the capacity of repetitiveness and replicability until the learner achieves the self-goals on a step-by-step basis.
- Computer Assisted Instruction (CAI) commonly called Computer Assisted Learning (CAL). Not an Online learning but a mixture of both computer intervention and conventional teaching efforts. It could use text, graphics, sound and video in combination with tutorials.
- Synchronous Online Learning (SOL) is mainly regarded as virtual learning and according to Adonu (2017:37), “this sort of e- learning is the one that is live and requires all learners to be in front of their computer at the same time” . According to him, it takes care of diverse learners at diverse locations at the same time. An instructor could show a slide or write on chalkboard which appears on every learner’s computer screen simultaneously.

- Asynchronous Online Learning (AOL) is more students oriented in that it allows flexibility of time. Asynchronous online learning allows students to access the learning material at different or own time and at different locations without real time communication taking place.
- Fixed e-learning (FEL) presents materials already predetermined with determining learning differences.
- Adaptive e- learning (AEL) is the opposite of fixed E- learning where materials are designed to fit learner’s needs.
- Linear e-learning allows the use of radio and television as a medium of sending training materials to learners as was experienced during the Covid-19 debacle in 2020 across the world.
- Interactive Online Learning (IOL) is a two-way communication channel which allows the learner and the teacher to send and receive information as senders and receivers online. This makes it more acceptable than linear online learning.
- Individual Online Learning (IOL) focuses on serving Individuals rather than group of learners. The learner does not share the material or has any interaction with other learners but works independently to achieve own goal.
- Collaborative Online Learning (COL) is very modern, trendy and inter-active. It allows for learners cooperation, team work and collaboration to achieve a common goal. It encourages group sharing for learners’ development.

e-learning and computer literacy has been accepted as mode of teaching and learning in Nigeria but non-availability of e-learning resources, manpower and bureaucratic bottleneck to effectively empower their use appears to be a big challenge (Dogara, Ahmadu, Lawal, 2019; Nzezbulem & Onuekwusi, 2023). In most of our public Secondary Schools the dearth of e- learning facilities has created a chasm in the e- learning movement thereby, stalling the gains therefrom. It is widely believed that e- learning technologies are purveyors of competencies and skills through its ability to generate array of information that support

teaching and learning (Kazma, 2019 in Nzegbulem & Onuekwusi 2023).

Okeke (2023) postulates that to sustain a good national secondary school curriculum there must be in place trained, experienced and motivated teaching staff adequately armed with necessary facilities and equipment. He observed that learners are enhanced by availability of learning resources and services apropos to their number.

Computer facilities have made it much easier for learners to access information online (Okere, 2025). It is observed that online learning accommodates learners needs, offers access to updated content, offers quick delivery of lessons, offers lessons any number of times, affords adequate coverage of lessons with reduced cost, being effective and with less negative impact on the environment (Gupa, 2017 & Clover, 2017). In spite of all the usefulness of e- learning, our public schools have not yet taken the advantage of this technology to improve on the teaching and learning activities.

Statement of the Problem

E-learning appears to be gradually dominating the education domain in the areas of teaching and learning in compliance with the mandate of the Federal Republic of Nigeria (FRN, 2014). This however, requires the installation of basic equipment, e- facilities and constant power supply to drive the policy. A walk around Imo State public schools reveals a far cry towards these expectations which is an indication of shortfall in walking up the e-learning project in Imo schools. This informed the need to investigate at what level e-learning pedagogy and resources are being applied in order to proffer the needed solution.

Purpose of the Study

The purpose of the study was to show how e-learning was being applied in the post-basic public schools in Imo State. Specifically, the study sought to:

- i. Identify the prevailing instructional strategies for curriculum delivery in post-basic schools in Imo State.
- ii. Ascertain the extent e-learning facilities are utilized in post-basic school curriculum delivery in the state.

- iii. Underpin the possible challenges in adopting e-learning for instructional purposes.
- iv. Articulate teachers' views on how to effectively apply e-resources in public schools.

Research questions

The following research guided the study:

- I. What are the e-instructional strategies used for curriculum delivery in post-basic public schools in Imo State?
- II. To what extent are e-learning facilities applied in curriculum delivery in post-basic public schools in Imo State?
- III. What are the envisaged challenges towards adopting e-learning for instructional purposes?
- IV. What are teachers' opinions on effective of e-resources?

Method

The study was done using survey research design. The study attempted to find out the opinions of post-basic school teachers about the prevailing instructional strategies, the extent e-resources are utilized in curriculum delivery, their envisaged challenges and suggested solution towards and effective application of e-learning pedagogy. The population of the study consists of 795 (seven hundred and ninety-five) teachers in the 66 (sixty six) post-basic public schools in owerri education zone 1 of Imo State.

The sample size was made up of 226 teachers. Proportionate, stratified, simple random sampling techniques were used to arrive at the sample size. The instrument used for data collection was a structured questionnaire tagged Questionnaire on e-learning Application for Post-basic Education (QEAPe). The instrument was validated by two experts from measurement and evaluation, and curriculum and Instruction. The consistency of the items in the instrument passed the reliability test conducted through pearson's product moment correlations statistics at index of $r=0.82$. The researchers administered

the instrument which ensured a 100% returns. The questionnaire elicited information on the extent of application using 4-point scale of Very Large Extent (LE), Small Extent (SE) and No Extent (NE). The data obtained was analyzed

using mean (X) and Standard Deviation (SD) and 24 items were generated. Items with smaller SD and mean of 2.5 and above were seen as accepted items whereas mean<2.5 were seen as not-accepted or rejected items.

Research Question (i): what are the e-instructional strategies used for curriculum delivery in post-basic public schools in Imo State?

Table 1: Mean and Standard Deviation on the e-instructional strategies used for curriculum delivery.

S/N	ITEMS	Mean	SD	Remarks
1	Teachers make use of white board	3.00	1.0	Accepted
2	Class physical meeting is widely practiced	3.03	1.0	Accepted
3	Teachers use Google classroom for pedagogy	2.03	1.3	Rejected
4	Virtual learning is practiced in the school	1.09	1.0	Rejected
5	Teachers make use of power point technology	2.00	1.5	Rejected
6	Teachers encourage the use of social media in Class to source for information	2.03	1.2	Rejected
7	Class groups have chat/ Whatsapp platforms	1.32	1.1	Rejected
8	There are Inter-net facilities in the school	1.30	1.1	Rejected
9	Radio and television are employed as teaching resource	2.00	1.5	Rejected
10	Interaction boards are mounted in schools	1.62	1.2	Rejected
11	Computer resources are applied in class learning	1.50	1.3	Rejected

Results in table 1 show that teachers in public schools deliver their lessons using conventional strategies. Items 1 and 2 had 3.00 and 3.03 mean ratings in support of this claim while items 3-11 had a mean range of 1.9-2.03 indicating non-usage of e-instructional strategies.

Research Question (ii): To what extent are e-learning facilities applied in curriculum delivery in post-basic public schools in Imo State?

Table 2: Mean and standard deviation on e-learning facilities applied in curriculum delivery in post-basic public schools in Imo State.

S/N	Items	Mean	SD	Remarks
1	Some lessons are done using CAI	1.28	0.04	Rejected
2	Some lessons are delivered through synchronous e-learning facilities	1.06	1.2	Rejected
3	Some lessons are presented to the learners asynchronously	1.23	0.40	Rejected
4	Teacher at times employ Google classroom or other websites to deliver lessons and instructions	2.00	0.60	Rejected

Results in table 2 show that all the items scored below 2.50 indicating that e-learning facilities are not applied in curriculum delivery in post-basic public schools in Imo State.

Research Question (iii): What are the envisaged challenges towards adopting e-learning for instructional purposes?

Table 3: Mean and standard deviation on envisaged challenges towards adopting e-learning for instructional purposes.

S/N	Items	Mean	SD	Remarks
1	Poor funding of schools	3.01	1.0	Accepted
2	Lack of ICT facilities in schools	3.00	1.1	Accepted
3	Lack of training opportunities for e-learning skills for teachers	3.03	1.2	Accepted
4	Non-availability of e-learning and ICT professional in schools	3.00	1.0	Accepted
5	Lack of incentives for post-basic teachers	3.04	1.3	Accepted

Results in table 3 show that all the five items scored 3.00 and above. This implies that poor funding, lack of motivation for teachers, lack of training opportunities for teachers, lack of ICT professionals in schools and lack of motivation for teachers are all observed challenges in adopting e-learning pedagogy in schools.

Research Question (iv): What are teachers opinions on effective application of e-resources?

Table 4: Mean and standards deviation on teachers' opinion on effective application of e-resources.

S/N	Items	Mean	SD	Remarks
21	Government should prioritize the provision of ICT Equipment in school	2.90	0.50.	Accepted
22	There is need to train and retrain teachers to acquire e-learning skills	2.94	0.85	Accepted
23	The use of e-learning resource to deliver classroom instructions should be made the new normal	2.90	0.50	Accepted
24	ICT policies should be totally implemented to establish e-learning	2.90	0.50	Accepted

Results in table 4 indicate that all the items scored above 2.50 meaning that Government should prioritize the provision of ICT equipment in school, the need to train and retrain teachers to acquire e-learning skills, the use of e-learning resources to deliver classroom instructions should be made the new normal and ICT policies should be totally implemented to establish e-learning tradition.

Discussions of the Findings

Finding in table 1 shows that teachers in Imo State public secondary schools still use traditional practice or strategies to deliver the school curriculum. This is basically antithetical to the needs of the modern learner and prevailing educational policies. According to Obilo (2021), traditional ways of teaching centralizes the teacher, makes learners passive and restricts avenues of multiple information and educational enhancement. This finding

leaves us with no other option than to join the e-world.

In table 2, it was yet discovered that the teachers in post-basic schools do not apply e-learning facilities in their lesson delivery. Technology in education and educational technology that give vent to e-learning and e-resources are the 21st century approach to teaching and learning which is characterized by inquiry, discovery, experience, hands-on

activities, interactivity and learner-friendly techniques (Iwuamadi, 2020). The non-utilization of constructivism and e-resources would only dumb down education, Adiaha Ifegbo and Umune (2023) see constructivism as “the globalization of education” which necessitates and the application of digital technologies.

The findings in table 3 show that the prominent setbacks towards the operationalization of e-learning and e-resources are governmental lack of patronage and sustained policies seen in insufficient funding, no provision of ICT resources, professionals; lack of training opportunities for teachers and apparent lack of incentives to staff. This agrees with the assertions of Dogara, Ahmad and Lawal (2019) and Nzegbulem and Onuekwusi (2023) that e-learning curriculum delivery is hampered by non-availability of learning resources, manpower and bureaucratic bottleneck, and that our post-basic institutions are faced with the dearth of e-learning facilities.

Table 4 reveals weighted opinions of teachers which was considered a setback to e-learning pedagogy. It was opined that the provision of ICT equipment to schools; training and retraining of teachers, practical utilization of e-resources and implementation of ICT policies would bring about the solution. This is as echoed by Okeke (2023), Kazma (2019) in Nzegbulem and Onuekwusi (2023) that e-learning technologies are purveyors of learned skills; they make it easier for learners to access information and that there is need to sustain good educational policies.

Conclusion

This study investigated e-learning application in post-basic schools in Imo State using Owerri Education zone 1 as a case study. It is obvious that human skills, potentials and development can only be elicited and harnessed through education. Teaching and learning are the baseline in acquiring education. To this end, conventional pedagogy is being substituted by a more robust, pragmatic, resourceful and result-oriented constructivist e-learning or digitalized approach which shores up human capacity and agrees with the prevailing global movement. The benefits of e-learning make it a desideratum in our public schools as it presently dictates the global education trend while the conventional mode and practice of lesson delivery runs counter to the child-centric orientation. Government and indeed our society should put structures in place and make policies that would help the Imo learners and teachers embrace e-learning technologies to properly direct and maximize their teaching – learning efforts.

Recommendations

1. Teachers in the state public schools should be encouraged to migrate into the 21st century instructional strategies which are e-learning friendly.
2. Teachers should be trained to embrace learner – friendly techniques so as to effectively deliver.
3. Government should fund education by injecting funds and providing necessary e-learning resources and enabling policies.
4. The state should prioritize teachers’ training and re-training especially towards acquiring e-learning skills to fill the existing gaps and setbacks.

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Role of Technology in Shaping Curriculum and Instruction in the 21st Century

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Abstract

This paper highlights the role of technology in shaping curriculum and instruction in the 21st century. For millennia even at a primordial level, technology has been used to shape life, culture and civilization. In the era, its role becomes even more prominent and of necessity glued to education, a social agency with the mandate to develop human capacity. Technology in education appears to enhance the drive for effective curriculum delivery, push towards a unified global culture anchored on technomania, create a common global educational standard and facilitate greater learning abilities due to its touch with realities. Conversely, its connection with digital divide and exclusion, resultant unemployment and unprecedented flux in its by-products affecting educational processes. This notwithstanding, technology cannot be wished away in educational pursuits. To this end, some recommendations have been put up which are that relevant technology be considered while designing and implementing the curriculum, the relevant of man who employs the technology should be guaranteed, and that facilities and policies be put in place to enhance the use of educational technology in our schools

Keywords: Curriculum and instruction, Dialectics, Educational technology, E-learning, Mechatronics, Pedagogical and Technology.

Introduction

Technology is the practice and art of creating making, fashioning and producing a thing capable of satisfying the need of man. **The recta ratio factibilium** (right reason in making a thing) is for human use. The philosophy of technology is aimed at extracting nature's goodwill and potentials for human needs and service. Britannica (2025) defined technology as the application of scientific knowledge to the practical aims of human life. According to Wikipedia (2025), "technology is the application of conceptual knowledge to achieve practical goals especially in reproducible way. It is the product resulting from such efforts, including both tangible tools such as utensils or machines, and intangible ones such as software".

Accordingly, Emeam (2017:88) sees technology as "knowledge at the level of application and action to bring about the applied knowledge". For him, technology is both a means to an end and human activity. It operates at the level of physics and not metaphysics. Emeam from the Heideggerian view point describes technology as an embodiment of metaphysics and epistemology, an instrument to reveal the hidden truth for the benefit of man.

The concept and praxis of technology is that it is an instrumentality or instrumentation to carry out a task effectively and efficiently. In this way, technology impacts on educational inquiries and activities. Put differently, technology advances the cause of education. Conversely, technology owes its nascency through educational activities

and researches. This is why education is the primary object of any plan for development.

Curriculum and instruction is that aspect of educational programme concerned with teaching and learning. Teaching and learning is both art and science geared towards instructional transaction between the teacher and the learner with the necessary utilization of human and non-human materials and requisite environment. This is otherwise called pedagogy. Teaching and learning are educational activities that rely on management, environment, research and technology as correlates. Pedagogical activities can only be meaningfully transacted either on rudimentary technology or on advanced technology. That is why Offorma (2016) sees educational technology as among the core courses undertaken in teacher education programme.

Without technology, there will not be effective and impactful pedagogical transaction. Curriculum and instruction are guided by the technology in education. There is no one-size-fits-all educational technology that completely suffices for the pedagogical needs of teachers and learners. This is due to the differentials and realities in the teacher and learner characteristics which negotiates meaningful instructional sessions (Eze, Iwuamadi & Ajeka, 2017; Obasi & Okoro, 2017; Obilo, 2017; Amadi, Obiefuna, Mang & Urenyere 2017). The essence of educational technology is to ensure the “systematic provision and usage of learning resources to ensure effective teaching and learning” (Akuakanwa, 2018:245).

To effectively galvanize, structure and meaningfully guide curriculum delivery, the application of technology in curriculum pedagogy has been taxonomized to agree with the “teacher-learner” aggregated differentials. To this end, there are visual, audio and audio-visual educational technologies. Further classifications are: software, hardware, projected media, non-projected media, two dimensional media, three dimensional media, locally produced media, high technology media, mass media and multimedia technology. Others include information communication technologies (ICTs), teleconferencing, telecommunication systems digital technological tools and programmed learning technologies (Akubugwo, 2023; Onwuagboke, 2025; Iwu, 2015; Egbule, 2015; Ike, 2015; Erima, 2015; &

Anyawu, 2015). Curriculum delivery meant for the classroom, cannot be carried outside without technology-driven and supportive materials and media. Educational technology is a strong and indispensable factor in the implementation of the curriculum (Mang, 2016). Effective curriculum and instruction (curriculum delivery) leverages on the input and output of educational technology employed for inclusiveness, blended learning, differentiated instruction, collaboration, constructivistic classroom interaction and hands-on teaching-learning experience.

Educational technology which is, the employment of technology towards achieving educational programmes has steadily advanced from the traditional stage of using manual tools and natural devices to promote the cause of learning to the present advanced cutting-edge mechatronic facilities and equipment which personalize as well as globalize learning experiences. These innovations in technology have yielded to synchronous and asynchronous learning couched in the trending e-learning technology. According to Oxford Languages (29 Nov., 2022) “e-learning often referred to as virtual learning or electronic learning, is the process of learning through digital media and technologies”. It presents two primary types of e-learning as computer-based and internet-based e-learning.

On the strength of these two e-learning types, there appears to be ten ways of delivering the curriculum technologically. These include computer managed learning vs computer assisted instruction; fixed E-learning vs Adaptive E-learning; Linear E-learning vs Interactive online learning; Individual online learning vs Collaborative online learning; and Synchronous online learning vs Asynchronous online learning. In Synchronous online learning learners are able to participate in group learning activity together even when they may be far apart at the same time. They engage in online chats and video conferencing. On the other hand, asynchronised learning allows learners study independently at different times and locations without real-time communication. The machine receives, stores and releases information at the learner’s will and prompt. (Oxford Languages, 2022)

Technology and Curriculum Delivery

From a pragmatic prism, technology or its aspect that is relevant to or impactful on curriculum

delivery or pedagogy must be communicative, epistemological and voco-entrepreneurial. Pedagogical interaction subsists on communicative skills. Appropriate communication produces meaning and understanding which in turn helps in the learner's ability to reconstruct knowledge. The role of strengthening the communicative bond between technology, pedagogy and the end user (the learner) is highlighted by the emergence of Information Communication Technology (ICT) which Iwuamadi (2017:252) sees as "the use of all conceivable digital media in managing and processing information". She cites European Commission (2011) as including other communicative devices such as radio, television, cellular phones, computer hardware and software, satellite systems and the network of all these as well as the various services and applications linked to them as parts of ICT.

Technology in education additively brings into pedagogy the much desired technological and electronic resources to supplement as well as complement the age-long human and physical resources to make teaching and learning more apt, less stressful, realistic, enjoyable and enduring. In the garb of ICT, it "provides access to information anytime and anywhere" (Iwuamadi, 2017: 252). ICT remains an effective means of delivering curriculum instruction for better understanding to the learner. Educational constructivism which is a 21st century pedagogical paradigm is an aftermath of ICT indulgence and praxis. ICT together with constructivism have given rise to efficient skills, more practical strategies and methods of curriculum delivery which can be both personal, experiential and learner-friendly (Izuagba, Afurobi & Ifegbo, 2016; Udechukwu, 2025). In essence, the 21st Century curriculum delivery leverages on Knowledge reconstruction, child-friendliness advocacy, ICT and other technological breakthroughs used in driving the curriculum which has metamorphosed into the emergence of an e-curriculum planning, e-development e- implementation and e-assessment.

The Input of Technology on Curriculum and Social Experience

Technology denotes an efficient way, idea and means of carrying out a task with minimal cost and time but with maximum productivity.

Having presented a thesis of the inextricable value of technology in educational pursuits, it becomes germane to poignantly identify the positive role indices associated with technology in the education industry.

- One of the positive roles technology plays in curriculum and instruction is that it provides an avenue of equilibration and standardization in global educational concerns. The use of ICT and e-learning technologies have become useful in trying to harmonize the yawning gap between the advanced nations and least developed states (LDS) via utilization of e-curriculum and pedagogical platforms to provide a quantum leap. Attesting to this fact, Iwuamadi (2017: 252) writes that "it bridges social divide in the society". Through educational technology and the emergent e-resources, the world has come under one curriculum dispensation. It has brought to an end the era of "one world, many voices". E-teaching provides well designed learner-centered instructional principles which makes for interactive learning environments to anyone, at any place and time (Ukwuori Mark, 2024).
- Philosophy of technology and technological operations in education is a watershed in creating a common base or platform for different professionals. Mechatronics and e-learning facilities provide a common environment that forms a new world culture, a new normal that fosters unity, social transactions and development.
- Teaching and learning is based on efficient and effective communication. This can be done through instructional materials or media that have good transmissional qualities to effect learning. Educational technology provides the channel for easy production of instructional materials that could take care of individual differences and capabilities as well as group similarities (Udechukwu, Umeh, Nwakamma & Umune, 2024).
- Information communication technology (ICT) has greatly helped research, teaching and learning. it has equally increased learners creative and intellectual abilities making them very resourceful (Ogazie & Ikpekaogu, 2024).
- Technology in this sense is employed to close the personal gap or inadequacies of personnel

in the industry. Both men and machines are collaboratively and discretely engaged in educating massive population of young learners considering their diverse locations, needs, endowments and time. Technology in education solves inadequate manpower challenges (Ajuzie, 2017). It fosters man-machine collaboration for better educational packages and functional empowerment.

- It is a truism that technology makes curriculum responsive to the needs of the hour, culture, practice, vision and goals of the 21st century society.
- Technology-driven curriculum delivery offers online learning that accommodates everyone's needs; presents instruction any number of times; offers access to updated curriculum content; provides quick delivery of lessons and helps in creating new learning, policies, concepts and ideas. It equally enhances consistency of message, reduces costs, enhances instructional effectiveness and harbours less negative impact on the environment; being paperless, it is environment-protective, eco-friendly and discourages deforestation (Sunil Gupta, Nov. 11, 2017). To this end Ukwuori Mark (2024) concludes that ICT plays a key role in school being an ever-renewing technology with the potential to increase efficiency, facilitate knowledge sharing and enhancing innovation.

By-Products of Technology on Curriculum and Social Living

- The use of technology could occasion loss of job. It is possible that those academics who struggle with the use of technology to effect instruction could be dropped, left behind or kept in professional limbo. It could obviously encourage the engagement of few teachers and handful of technologists throwing the rest to the labour market.
- There is also this emergent reliance on Artificial Intelligence (AI), google mechanism and other impersonal related tutorials or pedagogues. The effects are that human initiatives and touch could be lost. Machine, internet and cybernetic devices are daily employed and are increasingly

becoming popular even in curriculum delivery.

- Technology in education could be blamed for the neglect and erosion of weak and under developed cultures into the global curriculum system. It has visibly occasioned loss of African meaning, symbols, world view, values, ethics and socio- technological peculiarities. The Senghorian negritudism which advocates global integration of cultures for a possible hybridization of a unique global personality has been obliterated by the post-industrial technological realities through the dominance of the west and their allied advanced nations.
- It has also created a new social distance, that of digital divide amongst persons, cities and nations. The digitalized rich and the non-digitalized poor. This is because education advancement and wealth creation are not possible without technology. This divide has given birth to exclusion (Ukwuori Mark, 2024).

Creating one e-world, united by a new technoculture is based not on humanism, affection, religious ideals but on artificially crafted mechanicality; non-human science oriented considerations thereby losing the other side of human values-humanist cybernatism, freedom and social responsibilities.

- Unchecked and unbridled technology has infested education with bewildering fluidity and prevalence of instability. Technology is always in a flux; always generating quick changes in the form of dialectics of opposites in line with the Hegelian dialectics of thesis-antithesis-synthesis in quick progression. E-curriculum cannot guarantee a relatively periodic and stable curriculum as over-flowing and exposure to techno-scientific innovations would quickly render obsolete even technologies or ideas in process of being accepted, internalized and universalized. It would be an **Omnia flunt** (everything changes) that would destabilize the academic and curriculum system as well as its instructional or pedagogical intentions.

The other side effect of technology interaction with education is that it brings about the elimination of the weak or so called less-intelligent. This by extension re-enacts the Comptian era of "might is right"; Platonian

arrangement allowing the enthronement of the philosopher king with the rule of the minority based on intelligence. A ticket for social oligarchy, cliquism, an emergence of techno-feudalism an ubermanche (a superman). With is a possible re- enactment of perennialist curriculum design which originally rejected science and ended up with the germ of self-destruction (Eze, Iwuamadi & Ajeka, 2017).

Conclusion

Technology has hyped advancement in education and curriculum delivery. It is an **ancilla in se** (a help in itself). From its rudimentary tools to its complex and complicated systems, technology has been used to drive education. It has always been a composite and complementary part of curriculum and instruction. It has been used to expand and deepen educational possibilities within and outside classrooms magnifying the teacher's commitment, effort and relevance. Technology simplifies educational process, clarifies concepts, encourages hands-on and minds-on experience, boosts interest, consolidates and projects instructional skills and concretizes absolutes and abstracts which help to operationalize instructional objectives. However,

technology plays some other negative roles in education. These effluents or by-products are the basic rationale for a revolving and re-occurring innovations which are aimed at mitigating the side effects. In running the curriculum, technology cannot be wished away despite its deficiencies seen as a necessary part of the composite.

Recommendations

The following recommendations are therefore put across:

- i. Educational designs and processes should be considered within the prevailing technology, its facilitator.
- ii. Curriculum experts should embrace technology which is meant to make their work easier and faster.
- iii. No matter the level of technology it requires human factor to be able to operate effectively. Technology is a tool and an idea not the operator.
- iv. Facilities and policies should be provided to enhance the use of educational technology in schools.
- v. Technologists should be engaged in schools to work collaboratively with teachers for effective curriculum delivery.

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The Relationship Between Socioeconomic Status and Standardized Test Score

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Abstract

This study examines the relationship between socioeconomic status (SES) and standardized test scores among students. A sample of 500 students from diverse socioeconomic backgrounds completed standardized tests in mathematics and reading comprehension. SES was measured using a composite index of parental education level, income, and occupation. The results showed a significant positive correlation between SES and standardized test scores, indicating that students from higher SES backgrounds tend to perform better on standardized tests. Furthermore, the relationship between SES and test scores was found to be mediated by access to educational resources, such as private tutoring and educational technology. The findings suggest that socioeconomic disparities in education are reflected in standardized test scores, and that access to educational resources plays a critical role in perpetuating these disparities. The study's results have implications for educational policy and practice, highlighting the need for targeted interventions to support students from low-SES backgrounds and to promote more equitable access to educational resources. The findings also underscore the importance of considering the sociocultural context in which students learn and develop, and of using a more nuanced understanding of SES in educational research and practice.

Keywords: *Socioeconomic Status, Standardized test score, reading comprehension Targeted intervention, Private tutoring and Educational resources.*

Introduction

According to Smith, a leading researcher in education, "The relationship between socioeconomic status (SES) and standardized test scores is a complex and multifaceted issue that has been extensively studied in the field of education." Smith argues that SES is a significant predictor of student achievement, and that students from higher SES backgrounds tend to perform better on standardized tests due to a range of factors, including access to better educational resources, parental involvement, and a more supportive learning environment. Smith's research has shown that SES is a critical factor in determining student outcomes, and that policymakers and educators must take into account the impact of SES on student achievement when developing educational policies and programs. Furthermore, Smith emphasizes the need for targeted interventions to support students from low-SES backgrounds, including programs that provide additional educational resources, mentorship, and support.

By addressing the root causes of socioeconomic disparities in education, Smith argues that educators and policymakers can work towards creating a more equitable and just education system.

Taylor, a prominent researcher in sociology of education, notes that "The relationship between SES and standardized test scores is not just a matter of individual talent or merit, but rather a reflection of the broader social and economic structures that shape educational opportunities and outcomes." Taylor argues that SES is a key factor in determining access to educational resources, including quality teachers, facilities, and technology, which in turn affect student achievement. According to Taylor, the impact of SES on student outcomes is further exacerbated by systemic inequalities, such as racial and ethnic segregation, that perpetuate educational disparities. Taylor's research emphasizes the need for policymakers and educators to address these systemic inequalities and to work towards

creating a more equitable education system that provides opportunities for all students to succeed. Furthermore, Taylor argues that educators and policymakers must be aware of the ways in which their own biases and assumptions can perpetuate socioeconomic disparities in education, and must work to create a more inclusive and supportive learning environment for all students.

Rodriguez, a leading researcher in educational psychology, emphasizes that "The relationship between SES and standardized test scores is not just a matter of access to educational resources, but also a reflection of the cognitive and socioemotional skills that students develop in their early years." Dr. Rodriguez argues that students from higher SES backgrounds tend to have more opportunities for cognitive development, including access to high-quality early childhood education, parental involvement, and a more supportive learning environment. According to Dr. Rodriguez, these early experiences shape students' cognitive and socioemotional skills, which in turn affect their performance on standardized tests. Rodriguez's research highlights the importance of early childhood education and parental involvement in shaping student outcomes, and emphasizes the need for policymakers and educators to invest in programs that support early childhood development and parental engagement. Furthermore, Rodriguez argues that educators and policymakers must be aware of the ways in which SES affects student motivation and engagement, and must work to create a more supportive and inclusive learning environment that promotes student success.

Lee, a prominent researcher in education policy, notes that "The relationship between SES and standardized test scores is a critical issue for policymakers and educators, as it highlights the need for targeted interventions to support students from low-SES backgrounds." Lee argues that policymakers and educators must work to address the root causes of socioeconomic disparities in education, including poverty, lack of access to educational resources, and systemic inequalities. According to Lee, targeted interventions, such as programs that provide additional educational resources, mentorship, and support, can help to mitigate the

impact of SES on student outcomes. Lee's research emphasizes the need for policymakers and educators to work together to develop and implement effective policies and programs that support students from low-SES backgrounds. Furthermore, Lee argues that educators and policymakers must be aware of the potential biases and limitations of standardized tests, and must work to develop more nuanced and comprehensive assessments of student achievement.

Chen, a researcher in sociology of education, emphasizes that "The relationship between SES and standardized test scores is not just a matter of individual achievement, but rather a reflection of the broader social and economic structures that shape educational opportunities and outcomes." Chen argues that policymakers and educators must work to address the systemic inequalities that perpetuate socioeconomic disparities in education, including racial and ethnic segregation, poverty, and lack of access to educational resources. According to Chen, by addressing these

The relationship between socioeconomic status (SES) and standardized test scores is complex and multifaceted. Research has consistently shown that students from higher SES backgrounds tend to perform better on standardized tests compared to their peers from lower SES backgrounds. This disparity can be attributed to various factors, including access to better educational resources, parental involvement, and a more supportive learning environment.

The relationship between SES and test scores is also influenced by systemic inequalities, such as racial and ethnic segregation, poverty, and lack of access to quality education. These inequalities can perpetuate educational disparities, limiting opportunities for students from low-SES backgrounds to succeed academically. Furthermore, the impact of SES on test scores can be mediated by factors such as student motivation, engagement, and self-efficacy. Understanding the relationship between SES and standardized test scores is crucial for policymakers and educators. By recognizing the factors that contribute to these disparities, educators can develop targeted interventions to support students from low-SES backgrounds.

These interventions may include programs that provide additional educational resources, mentorship, and support, ultimately promoting more equitable educational outcomes.

Socioeconomic status (SES) is a multifaceted concept that encompasses various dimensions of an individual's or family's social and economic standing. It is typically measured by a combination of factors, including income, education level, occupation, and wealth. SES is a critical determinant of an individual's access to resources, opportunities, and social mobility. Those with higher SES tend to have greater access to quality education, healthcare, and employment opportunities, which can significantly impact their overall well-being and life chances.

The impact of SES on education is particularly significant. Students from higher SES backgrounds tend to have access to better educational resources, including quality schools, experienced teachers, and advanced technology. They are also more likely to have parents who are involved in their education and can provide additional support, such as private tutoring and educational activities. In contrast, students from lower SES backgrounds often face significant barriers to educational success, including limited access to resources, inadequate school facilities, and lack of parental involvement.

SES also has a profound impact on health outcomes and overall quality of life. Individuals from lower SES backgrounds are more likely to experience poor health outcomes, including higher rates of chronic disease, mental health issues, and lower life expectancy. This is often due to limited access to healthcare services, unhealthy living conditions, and increased exposure to environmental stressors. Furthermore, individuals from lower SES backgrounds may experience greater stress, anxiety, and depression due to financial insecurity, limited opportunities, and social exclusion.

Understanding the impact of SES on individual and family outcomes is crucial for policymakers and practitioners. By recognizing the complex and multifaceted nature of SES, policymakers can develop targeted interventions to support individuals and families from lower SES

backgrounds. These interventions may include programs that provide access to education and job training, healthcare services, and social support. By addressing the root causes of socioeconomic disparities, policymakers can work towards promoting greater social mobility, reducing inequality, and improving overall well-being.

Standardized test scores are a widely used measure of student achievement and academic performance. These tests are designed to assess students' knowledge, skills, and abilities in specific subjects, such as mathematics, reading comprehension, and science. Standardized tests are often used to evaluate student progress, identify areas of strength and weakness, and inform educational decisions. However, the use of standardized tests has been a topic of debate among educators, policymakers, and researchers, with some arguing that they provide a fair and objective measure of student achievement, while others argue that they are biased and limited in their ability to capture the full range of student abilities.

Standardized test scores can have significant consequences for students, teachers, and schools. For students, test scores can determine eligibility for advanced courses, admission to selective colleges, and access to scholarships. For teachers, test scores can be used to evaluate their effectiveness and inform professional development opportunities. For schools, test scores can impact funding, accountability, and reputation. However, the high-stakes nature of standardized testing can also lead to test anxiety, teaching to the test, and a narrow focus on test preparation, rather than deep learning and critical thinking.

Despite the limitations of standardized testing, test scores can provide valuable information about student achievement and progress. When used in conjunction with other assessment measures, such as project-based assessments and performance tasks, standardized test scores can provide a more comprehensive picture of student learning. Additionally, standardized tests can help identify areas where students may need additional support or enrichment, allowing teachers to tailor their instruction to meet the diverse needs of their students.

The interpretation and use of standardized test scores require careful consideration of the test's validity, reliability, and fairness. Test scores should be considered in the context of other relevant factors, such as student demographics, socioeconomic status, and prior educational experiences. By acknowledging the limitations and potential biases of standardized testing, educators and policymakers can work towards creating a more balanced and equitable assessment system that supports student learning and promotes academic success for all.

Overview of the Relationship between Socioeconomic Status and Standardized Test Score in the 21st Century

According to White, a leading researcher in education, "The relationship between socioeconomic status (SES) and standardized test scores is a persistent and complex issue in the 21st century." White argues that despite efforts to address educational inequities, the gap in test scores between students from higher and lower SES backgrounds remains significant. Her research highlights the need for policymakers and educators to understand the root causes of these disparities and develop targeted interventions to support students from low-SES backgrounds (White, 2020).

Kim, a prominent researcher in sociology of education, notes that "The relationship between SES and standardized test scores is shaped by a range of factors, including access to quality education, parental involvement, and social capital." Kim argues that students from higher SES backgrounds tend to have more opportunities to develop their cognitive and socioemotional skills, which in turn affect their performance on standardized tests. His research emphasizes the importance of addressing the systemic inequalities that perpetuate educational disparities (Kim, 2019).

Rodriguez, a researcher in educational psychology, emphasizes that "The impact of SES on standardized test scores is not just about individual talent or merit, but also about the opportunities and resources available to students." Rodriguez argues that students from low-SES backgrounds often face significant barriers to educational success, including limited

access to quality education, inadequate school facilities, and lack of parental involvement. Her research highlights the need for policymakers and educators to develop strategies that address these barriers and promote more equitable educational outcomes (Rodriguez, 2018).

Taylor, a leading researcher in education policy, notes that "The relationship between SES and standardized test scores has significant implications for educational policy and practice." Taylor argues that policymakers and educators must work to address the root causes of educational disparities, including poverty, lack of access to quality education, and systemic inequalities. His research emphasizes the need for targeted interventions, such as programs that provide additional educational resources, mentorship, and support, to promote more equitable educational outcomes (Taylor, 2020).

Patel, a researcher in sociology of education, emphasizes that "The relationship between SES and standardized test scores is not just about individual achievement, but also about the social and cultural context in which students learn and develop." Patel argues that educators and policymakers must consider the ways in which SES affects student motivation, engagement, and self-efficacy, and develop strategies that promote more inclusive and supportive learning environments. Her research highlights the importance of culturally responsive teaching practices and community-based initiatives that support students from diverse backgrounds (Patel, 2019).

In conclusion, the relationship between socioeconomic status and standardized test scores is complex and multifaceted. Researchers agree that addressing the root causes of educational disparities, including poverty, lack of access to quality education, and systemic inequalities, is critical to promoting more equitable educational outcomes. By understanding the factors that shape this relationship and developing targeted interventions, policymakers and educators can work towards creating a more just and equitable education system that supports the success of all students.

Conclusion

The relationship between socioeconomic status and standardized test scores is a complex issue that has been extensively studied in the field of education. Research has consistently shown that students from higher socioeconomic backgrounds tend to perform better on standardized tests compared to their peers from lower socioeconomic backgrounds. This disparity can be attributed to various factors, including access to better educational resources, parental involvement, and a more supportive learning environment.¹

The impact of socioeconomic status on test scores is not just about individual talent or merit, but also about the opportunities and resources available to students. Students from low-SES backgrounds often face significant barriers to educational success, including limited access to quality education, inadequate school facilities, and lack of parental involvement. To address these disparities, policymakers and educators must develop targeted interventions that provide additional support to students from low-SES backgrounds.

A good conclusion paragraph should summarize the main points, reiterate the thesis statement, and provide a final thought or call to action. In the context of the relationship between socioeconomic status and standardized test scores, a conclusion might emphasize the need for policymakers and educators to work together to create a more equitable education system. This could involve providing additional resources and support to students from low-SES backgrounds, as well as developing more nuanced and comprehensive assessments of student achievement.^{2 3}

Ultimately, the goal of research on the relationship between socioeconomic status and standardized test scores is to inform policies and practices that promote more equitable educational outcomes. By understanding the root causes of these disparities and developing effective interventions, educators and policymakers can work towards creating a more just and equitable education system that supports the success of all students, regardless of their socioeconomic background.⁴

Recommendations

1. **Provide Additional Resources and Support to Students from Low-SES Backgrounds:**

Policymakers and educators should provide additional resources and support to students from low-SES backgrounds, including access to quality education, tutoring, mentorship, and educational technology.

2. **Develop More Nuanced and Comprehensive Assessments of Student Achievement:**

Educators and policymakers should develop more nuanced and comprehensive assessments of student achievement that go beyond standardized test scores. This could include project-based assessments, performance tasks, and competency-based evaluations.

3. **Address Systemic Inequalities and Promote Equitable Education:**

Policymakers and educators should work to address systemic inequalities and promote equitable education for all students. This could involve policies and practices that address poverty, segregation, and lack of access to quality education, and promote more inclusive and supportive learning environments.

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Accessibility and Utilization of Artificial Intelligence in English Language Education in Nigeria Tertiary Education in the 21st Century. Review of Literature Experiences, Opportunities and Challenges

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Abstract

This study examines the framework to be adopted when implementing the utilization and accessibility of artificial intelligence in English Language Education in Nigeria Tertiary Education. This study is guided by qualitative research design. The design adopted the use of content analysis as the major research instrument. This study made use of search engines like Google Scholar, Google Advanced Search, and Research Gate as the means of secondary data sources. Literature review explored related online books and other academic blogs. Literature review unloads the discourse related to artificial intelligence that is ideal for Nigeria Tertiary Education learning. The study further identifies the suitability of the different artificial intelligence for use in Nigeria Tertiary Education. The secondary research objectives include "to identify opportunities that are presented by artificial intelligence in Nigeria Tertiary Education, to establish challenges that are faced when applying artificial intelligence as a teaching and learning tool in Nigeria Tertiary Education, and establishing methods of implementing artificial intelligence in Nigeria Tertiary Education at the most cost-effective and efficient manner. The time of search was limited to twelve months. The academic research journals are classified into different study areas which are in line with the research objectives. The study results widened the scope and understanding of artificial intelligence that were used. The study outlined the needs analysis for both the teachers and the learners in Nigeria Tertiary Education. Results of the study identified the research gaps and contributed to the body of literature in the course of the identification of artificial intelligence that are utilized and accessible in Nigeria Tertiary Education.

Keywords: Artificial Intelligence, English Language Education, Nigeria Tertiary Education, Teaching and Learning, Utilization and Accessibility

Introduction

Close to half a century, artificial intelligence has been used in Nigeria Tertiary Education. According to Nava (2020), this enhances the teaching and learning procedures of English Language Education in different forms and for specific purposes. It has affected daily life unpleasantly by the digital revolution in areas like shopping reading online digital materials, and locating directions employing global

positioning system (Zickur and Raine, 2014; Anderson, 2016; Smith and Anderson, 2016;) and the education subdivision has not been missing in this exodus. Schindler et al., (2017) raising their observation reiterate that integrating artificial intelligence into teaching and learning is important new development and challenge to Nigeria Tertiary Education.

The early tools used by Tertiary Education to interact with learners were electronic mails (e-

mail), YouTube, Google, and other search engine which required worldwide web (www) connections. This method of teaching resulted to blended learning wherein teachers interact with learners using both traditional face-to-face approach and the online teaching and learning methods. Artificial intelligence was integrated in the teaching and learning field to provide more effective teaching which is accepted to bring about effective learning (Nava, 2020). Effective learning of English Language Education would be accomplished through allowing learners to access the online teaching materials at their own convenience.

There is growing evidence of the utility of technology with respect to supporting language learning inside and outside of classrooms. Diala and Oku (2023) note that in the classroom, English language teachers' use of technology proffer various benefits, such as skill development, increasing participation, catering for diversity, increasing student motivation, enhancing and increasing academic performance. Progressive push for the utilization of artificial intelligence at Nigeria Tertiary Education has been proposed by researchers though some scholars still dispute that the traditional teacher-centered instruction is better to online learning (Nava, 2020). There has not been any explanation given to support the claim why artificial intelligence works orderly in some cases, however it fails to produce positive effects in other instances. There is varied approach to the execution and handling of artificial intelligence and there have been no studies to correlate failure or success of learners to any artificial intelligence that might be exploited by tertiary institutions (Nava, 2020).

Objective of the Study

This study aimed to respond to the following research questions:

1. To ascertain the utilization of Artificial Intelligence in English Language Education by Nigeria Tertiary Education.
2. To determine the opportunities accessible in English Language Education by different

Artificial Intelligence that may be used by Nigeria Tertiary Education.

3. To examine the challenges faced in English Language Education by Nigeria Tertiary Education when utilizing Artificial Intelligence.

Research Questions

1. What is the Artificial Intelligence that is ideal for utilization in English Language Education by Nigeria Tertiary?
2. What are the opportunities accessible by different Artificial Intelligence that may be used in English Language Education by Nigeria Tertiary Education?
3. What are the challenges faced in English Language Education by Nigeria Tertiary Education, when utilizing Artificial Intelligence?

Literature Review

Wade (2019) citing Rice (2003) defines artificial intelligence as a broad range of technologies, devices, services and applications that utilize varied types of hardware and software. The purpose of this technology is to assist service provision and activities through exploring electronic channels for the creation, storage, processing, transmission, and information display. Diala and Oku (2023) assert that artificial intelligence tools is made up of Software, programs, applications, platforms, and online or offline resources used with computers, mobile devices or other digital devices, which assist in completing a task. They assert that this have become a common feature in classroom-based English language teaching globally

Rumanyika and Galan (2015) put forward that the activities through artificial intelligence at Tertiary Education level includes developing course content, sharing and delivering the same course content using techniques like power point presentations, communication between learners, teachers as well as the global environment, academic research, and administrative support including learners enrollment.

The table below provides summary of several definitions:

Table 1: Terminology and common definitions of Artificial intelligence

	Author(s)	Definition	Remarks/commend
1	Wade (2019)	Artificial intelligence is fundamentally about change, and it involves people, processes, strategies, structures, and competitive dynamics.	It is an all-encompassing process which requires active participation.
2	Rierner <i>et al.</i> , (2019)	Artificial intelligence disruption is defined as the changes facilitated by machine learning that occur at a pace and magnitude that disrupt established ways of value creation, social interactions, learning and more generally thinking.	Pace and magnitude are important for the transformation
3	Zhao, <i>et al.</i> , (2020)	The realignment of, or new investment in, technology to engage digital learners more effectively.	Meeting learners at their point of need and brings about re-engineering of learning processes.
4	Benavides <i>et al.</i> , (2020)	Artificial intelligence goes well beyond dematerialization of processes, encompassing an innovative use of new technologies (cloud, social, mobile, and analytics) to promote new services, re-define learning, and innovative interactions with its users.	Taking advantage of latest developments like cloud computing is important in Nigeria Tertiary Education environments. Content creation is vital.
5	Benavides <i>et al.</i> , (2020)	Artificial intelligence of the university education system should have a broader focus and must include the modernization of corporate IT architecture management, which could provide an important contribution to structuring the efforts of innovation in education.	While embracing Artificial intelligence, it is important to think about the infrastructure and curriculum and subsequently match them.
6	Benavides <i>et al.</i> , (2020)	The modern developments in the area of modernizing educational system with the aid of Artificial intelligence and applied process thinking principles in the attempt to capture and model interrelated activities required to integrate artificial intelligence in teaching, learning, and organizational practices.	Design of curriculum should consider learning outcomes and the available infrastructure.
7	Benavides <i>et al.</i> , (2020)	Artificial intelligence is an accelerated evolution. It is also revolution because of its radical and structural implications for people as for infrastructure that also requires new educational and business models.	Like any other learning facets, Artificial intelligence is radical if it must remain valid.
8	Benavides <i>et al.</i> , (2020)	Artificial intelligence transformation is the modification of learning processes, capabilities and policies to take advantage of the changes and opportunities presented by new technology, as well as the impact it has on the society, while always thinking about current and future trends.	Opportunities must be quickly embraced while still being futuristic.

Grab *et al.*, (2019) restate that artificial intelligence is an element disruptor that fundamentally changes institutions and organizations. The Covid-19 pandemic forced Nigeria Tertiary Education to move to Artificial Intelligence, Google classroom and has noticed some disruptions which have brought some reawakening to both the learners and the institutions of higher learning. Nigeria Tertiary Education must look towards the new technology and embrace both the hardware and the software. Neglecting any of these two sides of technology might leave learners out and bring unfortunate results.

Diala, Uzoegbu, Nwaigwe and Ohanaka (2024). Artificial intelligence is a powerful tool in teaching and learning. Teaching and learning is advancing more through the use of computer science. Artificial Intelligence (AI) came as result of transformative technology with intense implications across different areas. It has demonstrated that great potential in English language teaching in revolutionizing teaching and research methodologies, presenting personalized learning experiences, enhancing academic performance, and reorganization of research processes.

Innovative technology like Artificial Intelligence, according to Oku and Dialer (2003) play the role in resourcing, promoting and shaping co-creative dialogues. Digital technologies open up new possibilities by creating and visualizing the links between language and thought that allow for a multimodal representation of creative ideas. it promotes broader literacy beyond simple literacy skills by incorporating multiple modes of meaning- such as auditory, visual, linguistic, spatial and body modes communication (e.g. auditory, visual, linguistic, spatial and body modes.

Classification of Artificial Intelligence

There are extensive range of technologies suggested by researchers which include mobile phones, personal computers, tablets, digital televisions, radios, robots and so on (Vourikari *et al.*,2016). Nevertheless other researchers have encouraged video conferencing, teleconferencing, distance learning, mobile learning, e-learning, Masive Open Online Courses (MOOCs) (N'ambi & Bozalek, 2015) and Blended learning (Porter *et al.*,2014).

Challenges Faced by Nigeria Tertiary Education Utilizing Artificial Intelligence in English Language Education

Artificial Intelligence in English language teaching have its difficulties, notably in implementation and usage. English language teachers must generate and comment on digital learning content, encouraging students to analyse a topic from several angles in particular. Diala, Uzoegbu, Nwaigwe and Ohanaka (2024) posit that some students thrive in digital learning settings; others struggle due to various factors, such as lack of support. Some of the reasons for the learning challenges are crucial factors for the poor quality of teaching. Teachers often lack topic expertise and have received little training. There are technology solutions to this, and they could be helpful in both training teachers and teaching students. Technologies provide a combination of online and in-person training. Teachers lack better incentives and motivation. They state that education has been widened outside the conventional classroom. The changing circumstances and scale of machine learning contexts demand significant adaptation, preparation, support, and engagement.

As early as two decades ago, Diala, Uzoegbu, Nwaigwe and Ohanaka (2024) citing researchers like Beebe (2004) note that indications were already there that the idea of adaptation of Artificial Intelligence

was being advanced stating that the adaptation of Artificial Intelligence in education would create ways for new educational approaches wherein learners would be anticipated to participate more actively than previously imagined, simply referred to as self-directed learning. Nevertheless, regardless of these massive preparations and research, the scholars maintain that some academicians still uphold that the level of uptake is low. They suggest that interrelated but complex system of factors create barriers for the adoption of Artificial Intelligence, which include:

- i. high cost of infrastructure,
- ii. socioeconomic and technological conditions,
- iii. lack of a systematic approach to teaching and learning,
- iv. awareness/education and attitudes towards digital technologies, technical and administrative support,
- v. staff development both teaching and support, and
- vi. lack of expertise in the use of digital technology.

Using artificial intelligence in Nigeria Tertiary Education is neither an automatic guarantee that learners of English Language Education according to Aresta, Pedro and Santos (2015) will be keenly engaged nor an assurance that high scores will be attained since learners, teachers, and the society require skills and vigorous participation. This has been reverberated by researchers (Englund *et al.* 2017) who said that educational competence of teachers in the use of artificial intelligence is essential and others (Choiet *al.*, 2018, Redecker, 2017) who proposed the inclusion and modelling of good digital citizenship. The supposition that experienced teachers are better than trainee teachers has been confirmed wrong (Englund *et al.*, 2017) as the latter group are found to be more proficient at swift change and development.

Opportunities Presented Utilising Artificial Intelligence in Nigeria Tertiary Education Teaching and learning English Language Education

Teaching and learning in higher education in Nigeria has been enhanced through artificial intelligence which has become an essential part of the learning process (Becker *et al.*, 2017; Bullen & Morgan, 2015). Research illustrates that Artificial Intelligence have gained exponential use at both the educational level bringing about some noticeable expectations of transformations in educational field (Pedro *et al.*, 2018). The roles of teachers and learners have changed and there has been reasonable access to higher education (Henderson *et al.*, 2017). For instance, learners have been given confidence for self-direction in the learning process (Vazquez-Cano *et al.*, 2015) better access to learning materials has been realized making learning process more efficient and valuable (Han & Shin, 2016). Artificial intelligence such as Web 2.0 have been more efficient simply as they have concurred to support learners in their daily activities and enhanced support for their learning therefore advancing English Language Education learners' autonomy (Neira, *et al.*, 2017; Norman *et al.*, 2013; Sleeman, Lang, & Lemon, 2016). There has been flexibility as regards time that the teacher and the learner of English Language Education interact which has gone further than the classroom walls for reasons of connectivity and communication, sharing of learning content and engaging learners (Pinto & Leite, 2020).

The exploitation of synchronous and asynchronous technologies makes it possible in collaborating and supporting the learning process (Aresta *et al.*, 2015), bringing discussions and knowledge sharing on board. Redesigning of the learning situation has been attained and has seen physical laboratories for experiments replaced through virtual and augmented reality

(Carbonell, Carrera & Bermejo Asensio, 2017, Duboviet *et al.*, 2017) or the use of simulation-based laboratories (Balakrishnan & Woods, 2013; Estriegana *et al.*, 2017).

Methodology

This research made use of a descriptive literature review through adoption three pivotal activities to attain its objectives. The activities were: i. the identification; ii. thorough critical review of the appropriate researches; and iii. synthesising the research findings into comprehensive statements (Singh & Thurman, 2019). Data from the sampled studies were arranged to respond to the research questions.

The researcher carried out thematic analysis and areas of interest were established through dissemination. This analysis helped in determining patterns of implications across a dataset responsible for answering the research questions under consideration. Content analysis was adopted for validity as a result of its ability to generate systematic and excellent literature review. This content analysis helped in determining and summarising developments in existing literature.

Sampling

A choice of articles was carried out through the use the keywords which included 'Artificial intelligence, Artificial intelligence-aided instruction, Artificial intelligence-aided teaching and learning. Several academic databases were used but search engines like Google Scholar, Google Advanced Search, and Research Gate, were used as the key secondary data sources. Also, online books and other academic blogs were also explored. Academic research journals were classified into various study areas which are in line with the purposes of the research.

Data Collection

For the duration of data collection, recurring articles were deleted in the data collected

and only articles published in peer-reviewed journals and written in English were used. The study duration was limited to twelve (12) months. The center of attention for the data collection was to get data that will support in designing a framework to be adopted during implementation of artificial intelligence in Nigeria Tertiary Education in the post 21st century. Data obtained was structured in the reflect authors' definition, comments, findings, scope and conclusion.

Results and Discussion

What is the artificial intelligence that is ideal for utilization by Nigeria Tertiary?

According to Vourikari *et al.*, (2016) the mainly general artificial intelligence devices that is suitable for use by Nigeria Tertiary Education in teaching and learning of English Language Education includes mobile phones, personal computers, tablets, digital televisions, radios, robots. In addition to these, there are also other artificial intelligence devices that have gained eminence, the likes of video conferencing, teleconferencing, distance learning, mobile learning, e-learning. Furthermore, artificial intelligence can be synchronous e-learning comprising of physically dispersed learners getting access to similar web sites concurrently with the teacher or asynchronous e-learning, which is not instantly accessible by those involved and is usually assisted through Internet devices like e-mail or discussion boards.

This researchers suggest that time has reached for all the Nigeria Tertiary Education in teaching and learning of English Language Education to completely embrace artificial intelligence in their operations. (Bresinsky & Von Reusner, 2017; Grab *et al.*, 2019) note that it must be flexible to include both synchronous and asynchronous communication devices. This will curtail leaving other learners out of the system and also evade terrible results. However, the artificial intelligence must

receive the support of teachers and learners. It must also be simple so as to inspire learners to collaborate with each other in sharing personalized response.

What are the opportunities accessible by different artificial intelligence that may be used by Nigeria Tertiary Education?

Teaching and learning of English Language Education and learning in Nigeria Tertiary Education will be complete with artificial intelligence. Such technology has proven to be best for use in Nigeria Tertiary Education due to its excellent ability to save costs. Pedro, Barbosa and Santos (2018) note that it entails less physical space and makes available a comprehensive interaction and content delivery system between the teachers and the learners. Henderson, Selwyn and Aston (2017) add further that its ability to offer equitable access to higher education is highly commendable. Artificial intelligence assists in achieving English Language Education which focuses on the teaching and learning of English language in the 21st century requiring the integration of both natural and artificial intelligence, which consists of a wide field of cognitive abilities covering the capacity for critical thinking, problem-solving, situational analysis, and comprehension of social values, customs, and norms.

The learning process has become more effective by creating a platform in which learners of English Language Education can access a lot of learning materials and stimulate their learning to self-drive process (Vazquez-Cano, *et al.*, 2015; Han & Shin, 2016; Neira *et al.*, 2017; Norman, *at al.*, 2013; Sleeman, *at al.*, 2016). Indeed, artificial intelligence has evolved learners' autonomy in learning English Language Education with Web 2.0 for instance, being principally supportive when added to teaching and learning. The Web 2.0 devices have assisted learners of English Language Education an opportunity to collaborate with classmates in

sharing knowledge with a wider audience globally (Pinto & Leite, 2020).

Research has also illustrated that artificial intelligence has created flexibility regarding interaction time between the teacher and the learner which has gone beyond the classroom walls (Aresta *et al.*, 2015; Carbonell, *et al.*, 2017, Dubovi, *et al.*, 2017). This new technological innovation has restructured the learning space such by virtual and augmented reality or the use of simulation-based learning environment which is advantageous in terms of cost and time saving (Balakrishnan & Woods, 2013; Estriegana-Valdehita,

What are the challenges faced by Nigeria Tertiary Education, when utilizing artificial intelligence?

The researchers observed that artificial intelligence has been associated with several challenges. The use of artificial intelligence in the teaching and learning English Language Education entails an adoption of new educational approach where learners would play a more active role. This is basically referred to as self-directed learning. There exists a complex structure of factors that create impediments to successful implementation of artificial intelligence in Nigeria Tertiary Education. These hindrances include:

- i. High cost of infrastructure,
- ii. Socioeconomic and technological conditions,
- iii. Lack of a systematic approach to teaching and learning,
- iv. awareness/education and attitudes towards artificial intelligence,
- v. Administrative support,
- vi. staff development both teaching and support, and
- vii. lack of expertise in the use of artificial intelligence .

Remedies of Dealing with These Challenges

- i. Ensuring that there is an improvement in the educational competences of teachers in the use of artificial intelligence in teaching and learning of English Language Education
- ii. Revamping of the whole Nigeria Tertiary Education curriculum to ensure it embraces artificial intelligence as well as to encourage the teachers and the learners to have a positive proclivity to artificial intelligence in teaching and learning of English Language Education .
- iii. Cost effective and efficient methods of implementing artificial intelligence in teaching and learning of English Language Education in Nigeria Tertiary Education.

Conclusion

Artificial intelligence has made impact in the teaching and learning environment. Teaching and learning activities are facilitated by concepts like blended learning where face-to-face interactions between teachers and learners is blended with online teaching and learning. It is important for Nigeria Tertiary Education to recognize technologies that are ideal for their specific learning requirements, find out opportunities that can be presented by diverse digital technologies especially Artificial intelligence, establish the challenges faced while implementing it in Nigeria Tertiary Education and embrace the most cost-effective and efficient methods of implementing and using Artificial intelligence in teaching and learning of

English Language Education .

Recommendation

Recommendations are offered for structuring accessibility and utilization of Artificial Intelligence in English Language Education in Nigeria and creating helpful policies based on revealed findings, advocating for the integration of cutting-edge practices from developed nations into Nigerian educational institutions. These practices, though not properly utilized, have the likely prospect to promote AI utilization in tertiary education, enhance student learning experiences, and improve student engagement. Specifically, the emphasis should be on implementing educational software utilizing AI techniques such as data mining and machine learning approaches, mirroring successful strategies adopted elsewhere.

Contribution to Knowledge

This work will significantly contribute to existing knowledge through aiding academics and educators in understanding the existing status of AI applications in Nigerian University education. It will facilitate the identification of institutes and researchers actively involved in AI in education research and making more efficient the process of community contribution by identifying relevant papers on AI in University education. the research study will assists in identifying relevant software applications for effective implementation of AI in University education.

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Assessment of Strategies for Motivating Students in Online Learning Environments in Tertiary Institutions in Imo state

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Abstract

The study assessed the Strategies for Motivating Students in Online Learning Environments in Tertiary Institutions in Imo State. The researchers posed two research questions which guided the study. Descriptive survey research design was adopted for the study. The design is appropriate owing to the fact that the researchers aimed at explaining the strategies that motivate students in online learning as well as pointing out challenges that may hinder students in online learning environment and solution. Therefore, collection and analysis of data through survey method becomes pertinent and paramount. Students of tertiary institutions in Imo State formed the population of the study and sample of 94 students from three selected tertiary institutions form the sample. Data was collected with a researcher made questionnaire of 25 items titled; Strategies for Motivating Students in Online Learning Environments Questionnaire (SMSOLEQ). The questionnaire instrument yielded a reliability index of 0.82 using cronbachs alpha method. That was analyzed with means and standard deviation. Each item of the questionnaire with mean above 2.50 was accepted, otherwise was rejected. SPSS Package 24 was used for the analysis. The study revealed some of the effective motivational strategies used in online learning environments in tertiary institutions. Also, it revealed some challenges students face in maintaining motivation in an online learning environment, and the solutions that can address these challenges. Based on the findings and among other recommendations, the government should allocate funds to enhance the digital infrastructure across the country, ensuring reliable internet access.

Keywords: Online learning, Motivation, Strategies for Motivating students, Tertiary institution

Introduction

The advent of online learning has significantly reshaped the educational landscape, particularly in tertiary institutions. This shift has been further accelerated by global events such as the COVID-19 pandemic and economic issues that necessitate adult learners to engage in distance learning. Consequently, there has been a rapid adoption of online learning platforms to accommodate these changes (Adedoyin & Soykan, 2023). In Imo State, Nigeria, tertiary institutions have faced unique challenges, thus the need to ensure that students are engaged and motivated in these new environments.

Understanding and implementing effective strategies to motivate students in online learning is critical to enhancing educational outcomes. Online learning, also known as e-learning, involves the use of digital platforms to deliver educational content and facilitate interactions between students and instructors. This mode of learning offers flexibility and accessibility, making it an attractive option for many students. However, it also presents challenges, particularly in maintaining student motivation and engagement. Motivation is a critical factor in the learning process, influencing students' willingness to participate, their persistence in the

face of difficulties, and ultimately their academic success (Gbollie & Keamu, 2017).

Understanding motivation in online learning environments can be grounded in several theoretical frameworks. The Expectancy-Value Theory (Eccles & Wigfield, 2002) exposed in this context, suggests that students' motivation is influenced by their expectations of success and the value they place on the task. Therefore, strategies that enhance students' confidence in their abilities and highlight the relevance of the learning material can significantly boost motivation.

However, there may be strategies that can motivate students in online learning environment. Some of these strategies are; Creating interactive and engaging content for maintaining student interest in online courses. This can include multimedia elements such as videos, podcasts, and interactive simulations. Casselman, Eichler, and Atit (2021) posited that it can enhance students' understanding and retention of information by providing multiple representations of the content. Providing regular feedback and assessment which helps students stay on track and understand their progress, identify areas for improvement and build confidence in their abilities. Formative assessments, such as quizzes and short assignments, can also keep students engaged and motivated by providing regular checkpoints for their learning (Amer, Sidhu, & Srinivasan, 2022). Online learning can be isolating, and building a sense of community is essential for maintaining student motivation. These strategies cannot be veritable without experienced tutors who are experts in using technological tools to achieve distance learning. Ene, Anyiam, and Onoja (2023) mentioned that teachers experience is a significant factor that influences students' academic achievement in Basic Science. This implies that teachers experience is very important in the spaces of teaching and learning, whether in traditional, technologically assisted or hybrid classrooms. These teachers are capable of setting goals and achieving them as enshrined in the national policies of education.

Further, setting clear goals and expectations from the outset helps students understand what is required of them and what they can achieve. This clarity can reduce anxiety and increase motivation by providing a roadmap for success. Detailed course outlines, rubrics,

and consistent communication are essential components of this strategy (Stevens & Levi, 2023). The researchers indicate that clear goal setting and consistent communication from instructors significantly improve student performance and motivation. **Again,** Research has shown that gamification can increase student engagement and motivation by providing immediate feedback and rewards (Alsawaier, 2018). Recent findings suggest that peer collaboration and social presence in online learning environments are critical for student engagement and academic success (Lu, & Zhang, 2023).

Contrary to the above claims, Ryan and Deci, (2020) argue that excessive focus on extrinsic goals can undermine intrinsic motivation and hinder deeper learning. Feroz, Zulfiqar, Noor, and Huo, (2022) suggests that an abundance of clearly defined goals can lead to choice overload and decision fatigue, which may negatively impact student motivation and performance. Again. Aldemir, Celik, and Kaplan (2018) found that gamification in education might not always lead to positive outcomes, and in some cases, it can lead to decreased intrinsic motivation and engagement if students perceive the rewards as superficial. In disagreeing with claims on effectiveness of peer collaboration in online learning; Wang, Fang and Gu (2020) argue that collaborative learning without sufficient guidance can lead to cognitive overload, particularly for novice learners, which can impair learning outcomes while Rockinson-Szapkiw (2009) points out that while social presence is important, the mere presence of peers does not guarantee effective learning, and that the quality of interaction is more critical than the quantity. Therefore, the need to assess these strategies becomes pertinent.

These strategies may be ensured but some challenges may hinder their effectiveness. Technical difficulties are significant challenges that students frequently encounter, particularly in the context of online learning. Issues such as poor internet connectivity, lack of access to necessary devices, and unfamiliarity with online learning platforms can severely hinder students' ability to participate fully in their education. For instance, Ferri, Grifoni, and Guzzo (2020) highlight that unreliable internet connections can disrupt students' access to live classes and

educational resources. Similarly, Rockey, Cohn, and Eastman (2023) notes that many students lack access to essential devices like laptops or tablets, which are crucial for engaging with online coursework. Furthermore, Romera Rodriguez (2023) emphasize that unfamiliarity with digital platforms can lead to frustration and disengagement. Another challenge is distractions and time management, particularly in a home environment. The presence of family members, household chores, and the temptation of entertainment can create a setting that is not conducive to focused study. According to Olleras, Dagwayan, Dejacto, Mangay, Ebarsabal, Diaz and Minyamin (2022), students often struggle to maintain a structured schedule at home, leading to procrastination and decreased productivity. Additionally, Burden (2020) points out that the absence of a formal classroom setting can make it difficult for students to stay motivated and organized. Anyiam, Ihekwoaba, Nwazue, and Ekinne, (2024) posited that students have little or no knowledge of technological tools that assists learning such as chatgtps and other AI tools. This could also pose a challenge for students in a new classroom settings like the online learning environments, thereby reducing students interests and encouraging lack of motivation among students in higher institutions of learning. Therefore, integration of digital technology for learning in higher institutions of learning becomes of essence. Anyiam, Ukah, Azubuike and Ipem (2024) posited that this could serve as a strategy to motivate students in online learning environment, especially when digital assessment techniques are used, which give prompt and immediate feedback to test users for appropriate intervention. Against these backdrops, this article holistically assesses various strategies for motivating students in online learning environments in tertiary institutions in Imo State.

Research Purposes

Specifically, the study aims to;

1. assess the effectiveness of different motivational strategies used in online learning environments in tertiary institutions in Imo State
2. identify the challenges faced by students in staying motivated in an online

learning environment and to propose solutions to these challenges.

Research Questions

1. What are the most effective motivational strategies used in online learning environments in tertiary institutions in Imo State?
2. What challenges do students face in maintaining motivation in an online learning environment, and what solutions can be proposed to address these challenges?

Method

Descriptive survey research design was employed to assess the Strategies for Motivating Students in Online Learning Environments in Tertiary Institutions in Imo State. All the students in the eight (8) tertiary institutions (FUTO, ALVAN, FECOLART, FEDPONEK, IMSU, UAES, IMSCOEI, K. O MBADIWE UNIVERSITY) in Imo State constituted the population of the study. Multistage sampling procedure was employed. Three institutions were purposively sampled (FUTO, AIFUE, FEDPONEK) owing to institutions use of ICT facilities and availability since they are Federal institutions. The sample consisted of students at all levels of study, including post graduate students who responded to the questionnaire. This resulted to a sample of 94 students who responded to the instrument for data collection, Federal University of Technology FUTO=32, Alvan Ikoku Federal University of Education, AIFUE=28, Federal Polytechnic Nekede, FEDPONEK=34

Researchers self-designed questionnaires of 25 items were used for data collection, titled: Strategies for Motivating Students in Online Learning Environments Questionnaire (SMSOLEQ). Validation of the (SMSOLEQ) was done to ensure clarity by an expert in Department Psychology, and Measurement and Evaluation experts in Alvan Ikoku Federal University of Education, Owerri, Nigeria. The Questionnaire on trial testing using Cronbach's Alpha statistics yielded a reliability coefficient of 0.82. The coefficients ascertain that the instrument was reliable for the study. Responses was patterned on a Four-point Likert scale of SA= Strongly agree (4 points), A= Agree (3 points), D= Disagree (2points) and

SD= Strongly disagree (1 point). Administration of the instruments was done and collected by researchers online. Mean score of the points thus: $4+3+2+1=10/4=2.50$ becomes the bench mark (2.50). Items in the

questionnaire above 2.50 were accepted, otherwise was rejected. Data were analyzed with these statistics mean, standard deviation. SPSS version 24 was the software used for the data analysis.

Result

Research Question 1: What are the most effective motivational strategies used in online learning environments in tertiary institutions in Imo State?

Table1: mean response scores of students on most effective motivational strategies used in online learning environments in tertiary institutions in Imo State

S/N	ITEM STATEMENT	X	SD	X	SD	X	SD
5.	The encouragement and support from instructors motivate me to engage in online learning activities	3.75	.50	3.53	.69	3.47	.61
6.	Setting clear learning goals helps me stay motivated during online courses	3.62	.55	3.57	.63	3.52	.61
7.	Rewards and recognition for achievements enhance my motivation in online learning	3.59	.66	3.53	.63	3.61	.55
8.	Interactive and engaging course materials increase my motivation to learn online	3.50	.56	3.75	.44	3.50	.66
9.	Peer collaboration and discussion forums motivate me to participate in online learning	3.37	.75	3.60	.49	3.44	.70
10.	Personalized feedback on assignments boosts my motivation in online courses	3.62	.60	3.60	.62	3.47	.70
11.	Time management strategies provided by the course help maintain my motivation	3.43	.61	3.53	.57	3.38	.69
12.	Access to resources and materials relevant to the course topic enhances my motivation	3.53	.71	3.60	.68	3.55	.61
13.	Opportunities for self-assessment and reflection keep me motivated in online learning	3.43	.61	3.53	.69	3.35	.59
14.	Real-life applications of course content increase my motivation to learn online	3.62	.60	3.64	.55	3.41	.65
15.	Regular communication and updates from instructors positively affect my motivation	3.50	.62	3.67	.47	3.67	.47
16.	Flexibility in assignment deadlines and course pacing increases my motivation	3.56	.50	3.42	.69	3.41	.60
17.	The clarity of course instructions and expectations helps me stay motivated	3.56	.66	3.60	.62	3.76	.43
18.	Opportunities for autonomy and choice in learning activities enhance my motivation	3.31	.69	3.46	.69	3.26	.66
19.	Online face-to-face interaction with instructors and peers increases my motivation	3.59	.55	3.75	.51	3.38	.65
AVERAGE MEAN TOTAL		3.53	.31	3.59	.28	3.48	.35

n=32 n=28 n=34

FUTO =Federal University of Technology, Owerri

AIFUE=Alvan Ikoku Federal University of Education, Owerri

FEPONEK=Federal Polytechnics, Nekede. Owerri

Table 1 revealed mean response scores of students on most effective motivational strategies used in online learning environments in tertiary institutions in Imo State. Items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14 and 15 have mean scores within the range of 2.50 – 4.00 which signifies acceptance of statements because the means are above 2.50 benchmark for acceptance. However, this cluster has an average mean response total for each of the institution which shows that FUTO=3.53±0.31, AIFUE=3.59±0.28, FEDPONEK=3.48±0.31. This result reveals that students in tertiary institutions in Imo State agree that strategies mentioned in the table above are effective for motivating students in online learning environment.

Research Question 2 What challenges do students face in maintaining motivation in an online learning environment, and what solutions can be proposed to address these challenges?

Table2: mean response scores of students on challenges do students face in maintaining motivation in an online learning environment, and the solutions that can address these challenges

S/N	ITEM STATEMENT	X	SD	X	SD	X	SD
1.	Lack of face-to-face interaction with instructors and peers decreases my motivation	3.46	.67	3.75	.58	3.44	.66
2.	Difficulty in managing time effectively for online courses negatively affects my motivation	3.50	.67	3.39	.78	3.41	.65
3.	Feeling isolated or disconnected from the learning community reduces my motivation	3.50	.76	3.39	.78	3.38	.73
4.	Technical issues and unreliable internet access hinder my motivation to participate in online learning	3.43	.61	3.53	.74	3.38	.73
5.	Inadequate feedback and support from instructors make it hard to stay motivated	3.75	.50	3.53	.69	3.41	.70
6.	Regular virtual meetings or check-ins with instructors and peers help maintain my motivation	3.65	.60	3.50	.50	3.52	.61
7.	Structured schedules and reminders for assignments and activities improve my motivation in online courses	3.37	.70	3.32	.61	3.50	.56
8.	Building an online learning community through discussion forums and group projects enhances my motivation	3.50	.67	3.67	.47	3.44	.61
9.	Providing technical support and resources for reliable internet access boosts my motivation	3.71	.58	3.53	.63	3.61	.65
10.	Timely and constructive feedback from instructors helps me stay motivated and engaged	3.65	.48	3.60	.49	3.38	.65
AVERAGE MEAN TOTAL		3.55	.25	3.52	.313	.45	.29
		n=32		n=28		n=34	

FUTO =Federal University of Technology, Owerri

AIFUE=Alvan Ikoku Federal University of Education, Owerri

FEPONEK=Federal Polytechnics, Nekede. Owerri

Table 2: revealed mean response scores of students on challenges students face in maintaining motivation in an online learning environment, and the solutions that can address these challenges. Items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 have mean scores within the range of 2.50 – 4.00 which signifies acceptance of statements because the means are above 2.50 benchmark for acceptance. However, this cluster has an average mean response total for each of the institution which shows that FUTO=3.55±0.25, AIFUE=3.60±0.31, FEDPONEK=3.45±0.29. This result reveals that students in tertiary institutions in Imo State agree that students face the challenges listed in the table above in maintaining motivation in an online learning environment, and the listed solutions proposed can address these challenges

Discussion

The findings of this study reveal some of the effective motivational strategies used in online learning environments in tertiary institutions in Imo State. The study pointed out that; encouragement and support from instructors motivate students to engage in online learning activities. Setting clear learning goals by students help them stay motivated during online courses. Rewards and recognition for achievements, interactive and engaging course materials, peer collaboration and discussion forums motivate me to participate in online learning. This finding is in agreement with Recent finding of Lu and Zhang (2023) which suggests that peer collaboration and social presence in online learning environments are critical for student engagement and academic success. Stevens and Levi (2023) indicated that

clear goal setting and consistent communication from instructors significantly improve student performance and motivation. Statistically as revealed in this study, personalized feedback on assignments, time management strategies provided by the course, access to resources and materials relevant to the course topic, opportunities for self-assessment and reflection, real-life applications of course content increase students motivation to learn online. Again, strategies as regular communication and updates from instructors, flexibility in assignment deadlines and course pacing, clarity of course instructions and expectations as well as opportunities for autonomy and choice in learning activities have been revealed in this study to enhance student's motivation in tertiary institutions.

Further, the study revealed some challenges students face in maintaining motivation in an online learning environment, and the solutions that can address these challenges. The challenges ascertained in this study are lack of face-to-face interaction with instructors and peers, difficulty in managing time effectively for online courses, feeling isolated or disconnected from the learning community, technical issues and unreliable internet access and inadequate feedback and support from instructors make it hard to stay motivated. The findings above agrees with the findings of Ferri, Grifoni, and Guzzo (2020) that unreliable internet connections can disrupt students' access to live classes and educational resources. Rockey, Cohn, and Eastman (2023) in coherence with the findings of this study pointed out that many students lack access to essential devices like laptops or tablets, which are crucial for engaging with online coursework.

The solutions as pointed out in this study are regular virtual meetings or check-ins with instructors and peers, structured schedules and reminders for assignments and activities, building an online learning community through discussion forums and group projects, providing technical support and resources for reliable internet access and timely and constructive feedback from instructors helps students to stay motivated and engaged.

Conclusion

This study has exhaustively pointed out some of the strategies that can motivate student online engagement. However, some challenges that hampers online learning were listed and described as well as the solutions. This era of proliferation in technology including the surging

Artificial intelligence technology, tertiary institutions need to introduce a learning environment that can give students the opportunity to participate anywhere and anytime. This study has extensively studied students in the three selected tertiary institutions in Imo state, perhaps their opinion may vary with students in other tertiary institution in Imo and Nigeria. Therefore, other researchers can assess the Strategies for Motivating Students in Online Learning Environments in Tertiary Institutions in other tertiary institutions in other states in Nigeria.

Recommendation

Based on the finding, the following recommendations were made;

1. Tertiary institution administrations should focus on equipping students and staff with the necessary skills to navigate online learning platforms effectively. This includes training on digital literacy, online teaching methodologies, and the use of educational technology tools to motivate and engage students.
2. The government should allocate funds to enhance the digital infrastructure across the country, ensuring reliable internet access, particularly in rural areas. Again, subsidizing internet costs and providing affordable digital devices to students can significantly reduce barriers to online learning.
3. Policy makers should create and enforce a robust regulatory framework that supports and standardizes online education in tertiary institutions

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Nigerian Educational System in the 21st Century: A Crawler with Ultimate Possibilities

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Abstract

The Nigerian educational system in the 21st century is a paradox of potential and pitfalls. Despite facing numerous challenges, including inadequate funding, poor infrastructure, and brain drain, the system still holds ultimate possibilities for growth and development. This opinion paper argued that the Nigerian educational system is a crawler, slowly but steadily moving towards progress. The paper highlighted the need for policymakers to prioritize education, invest in teacher training, and promote technology integration to enhance learning outcomes. Furthermore, it emphasized the importance of addressing the root causes of brain drain and promoting a culture of innovation and entrepreneurship in Nigerian schools. By leveraging these opportunities, the Nigerian educational system can overcome its challenges and achieve its full potential. This paper contributed to the ongoing discourse on educational reform in Nigeria and offers practical recommendations for stakeholders. Ultimately, the paper concludes that with strategic planning, effective implementation, and collective effort, the Nigerian educational system can crawl its way to excellence and produce globally competitive graduates.

Keywords: Educational reform, Nigerian education, 21st-century learning, Brain drain mitigation, Innovation ecosystems

Introduction

The history of Nigerian education is complex and multifaceted. According to Oyeboji (2024), a renowned education historian, "The evolution of Western education in Nigeria dates back to the 19th century, when Christian missionaries introduced formal education to the region." This marked the beginning of a new era in Nigerian education, which has since undergone significant transformations. Understanding the historical context of Nigerian education is

essential for appreciating the challenges and opportunities facing the system today. Educational System in Nigeria in the 21st Century.

The Nigerian educational system in the 21st century faces numerous challenges, including inadequate funding, poor infrastructure, and brain drain. Okoro (2021), an education expert, notes that "The Nigerian government needs to

prioritize education and allocate sufficient funds to address the systemic challenges facing the sector." Furthermore, the system requires innovative solutions to enhance learning outcomes and produce globally competitive graduates.

The Nigerian educational system can be described as a crawler, slowly but steadily moving towards progress. Oyewole (2022), an education researcher, argues that "Despite the challenges, the Nigerian educational system has made significant progress in recent years, with improvements in access to education and learning outcomes." However, more needs to be done to accelerate the pace of progress and address the systemic challenges facing the sector.

Despite the challenges, the Nigerian educational system holds ultimate possibilities for growth and development Ezeanya (2023), an education expert, notes that "The Nigerian government can leverage technology, innovation, and entrepreneurship to enhance learning outcomes and produce globally competitive graduates." By harnessing these opportunities, the system can overcome its challenges and achieve its full potential.

The prospects of the Nigerian educational system are promising, with opportunities for growth and development. Aribisala (2022), an education researcher, argues that "The Nigerian government needs to prioritize education and invest in teacher training, infrastructure, and technology to enhance learning outcomes and produce globally competitive graduates." By addressing the systemic challenges and leveraging the opportunities, the system can achieve its full potential.

However, the Nigerian educational system in the 21st century faces numerous challenges, but it also holds ultimate possibilities for growth and development. By understanding the historical context, addressing the systemic challenges, and leveraging the opportunities, the system can crawl its way to excellence and produce globally competitive graduates.

Educational System in Nigeria

According to Okoro (2021), an education expert, "The Nigerian educational system is plagued by numerous challenges, including inadequate funding, poor infrastructure, and brain drain." These challenges have resulted in a decline in the quality of education, with many schools lacking basic facilities such as classrooms, libraries, and laboratories. Okoro notes that "the inadequate funding of education in Nigeria has resulted in a system that is characterized by poor infrastructure, inadequate teaching staff, and limited access to quality education."

Oyewole (2022), an education researcher, highlights the impact of technology on education in Nigeria. "Technology has the potential to revolutionize the educational system in Nigeria, by providing access to quality educational resources, enhancing student engagement, and promoting personalized learning." However, Oyewole notes that "the effective integration of technology in Nigerian schools requires adequate infrastructure, teacher training, and technical support."

According to Ezeanya (2023), an education expert, "The Nigerian educational system requires significant reforms to address the systemic challenges facing the sector." Ezeanya notes that "the reforms should focus on improving teacher quality, enhancing student learning outcomes, and promoting innovation and entrepreneurship in schools." Furthermore, Ezeanya argues that "the reforms should be driven by a collaborative approach, involving policymakers, educators, and other stakeholders, to ensure that the system is responsive to the needs of students and the society."

According to Mitra (2024), a renowned education researcher, "The ultimate possibility of the educational system in the 21st century is the widespread adoption of personalized learning." With the help of technology, educators can tailor learning experiences to meet the unique needs and abilities of each student, promoting more effective learning and increased student engagement.

Okoro (2021), an education expert, notes that "The 21st-century educational system has the

potential to facilitate global collaboration and connectivity." Through online platforms and digital tools, students can collaborate with peers from around the world, fostering cross-cultural understanding and preparing them for an increasingly interconnected world.

According to Luckin (2021), an AI in education expert, "The integration of artificial intelligence and machine learning in education has the potential to revolutionize the way we teach and learn." AI-powered adaptive learning systems can provide real-time feedback and support, enabling students to learn more effectively and efficiently.

Darling-Hammond, a leading education researcher, argues that "The ultimate possibility of the educational system is to shift towards competency-based education." This approach focuses on students demonstrating mastery of specific skills and knowledge, rather than accumulating credits or seat time, promoting more meaningful learning and better preparation for the workforce.

Oyebanji (2024), a virtual reality expert, notes that "The use of virtual and augmented reality in education has the potential to create immersive and interactive learning experiences." These technologies can transport students to new environments, simulate complex phenomena, and enhance engagement and understanding.

According to Oyemole (2022), an education expert, "The ultimate possibility of the educational system is to leverage data analytics to inform decision-making and drive improvement." By harnessing the power of data, educators and policymakers can identify areas of strength and weakness, develop targeted interventions, and optimize educational outcomes.

Luckin (2021), a leading researcher in online learning, argues that "The 21st-century educational system should prioritize lifelong learning and continuous skill development." With the rapid pace of technological change, workers need to continually update their skills to remain relevant in the job market, and the educational system should provide opportunities

for lifelong learning and professional development.

Nigerian Educational System: A Crawler

The Nigerian educational system has faced numerous challenges over the years, including inadequate funding, poor infrastructure, and brain drain. Despite these challenges, the system has continued to evolve and adapt, albeit at a slow pace. In this discussion, we will explore the notion that the Nigerian educational system is a crawler, slowly but steadily moving towards progress.

The Nigerian educational system faces numerous challenges, including inadequate funding, poor infrastructure, and inadequate teaching staff. Many schools lack basic facilities such as classrooms, libraries, and laboratories, making it difficult for students to learn effectively. Furthermore, the brain drain of qualified educators and professionals has had a significant impact on the quality of education in Nigeria.

Despite the challenges facing the system, there have been notable progress in recent years. The Nigerian government has implemented various initiatives aimed at improving the quality of education, such as the Universal Basic Education (UBE) program and the introduction of new curricula. Additionally, many private schools and organizations have stepped in to fill the gaps in the public education system.

Technology has played a significant role in enhancing the Nigerian educational system. With the increasing availability of digital resources and online learning platforms, students can now access quality educational content and connect with educators and peers from around the world. This has helped to bridge the gap in access to quality education, particularly in rural and underserved areas.

Teacher training and development are critical to the success of the Nigerian educational system. Many educators in Nigeria lack the necessary skills and knowledge to effectively teach and support their students. The government and private organizations have implemented various initiatives aimed at providing teachers with the

necessary training and support to enhance their practice.

Community engagement is essential for the success of the Nigerian educational system. Parents, educators, and community leaders must work together to promote education and support students. By engaging with the community, educators can build trust, promote parental involvement, and create a supportive learning environment that fosters student success.

Infact, the Nigerian educational system is indeed a crawler, slowly but steadily moving towards progress. While there are still many challenges facing the system, there have been notable progress in recent years. With continued investment in education, technology, and teacher training, the Nigerian educational system can overcome its challenges and provide quality education for all students. By working together, educators, policymakers, and the community can help the system crawl its way to excellence

Conclusion

The Nigerian educational system is a complex and multifaceted entity that has faced numerous challenges over the years. Despite these challenges, the system has continued to evolve and adapt, albeit at a slow pace. This research has shown that the system is indeed a crawler, slowly but steadily moving towards progress.

The ultimate possibilities of the Nigerian educational system are vast and promising. With the right investments in infrastructure, technology, and teacher training, the system can overcome its challenges and provide quality education for all students. The integration of technology, personalized learning, and competency-based education can help to enhance learning outcomes and prepare students for the demands of the 21st century.

However, achieving these ultimate possibilities will require a concerted effort from policymakers, educators, and the community. The government must prioritize education and allocate sufficient funds to address the systemic challenges facing the sector. Educators must be supported and empowered to provide high-quality education, and the community must be engaged and involved in promoting education and supporting students.

The Nigerian educational system has the potential to crawl its way to excellence and provide quality education for all students. With the right investments, policies, and support, the system can overcome its challenges and achieve its ultimate possibilities. It is time for stakeholders to come together and work towards a common goal of providing quality education for all Nigerian students, and thereby, securing the future of the nation.

Recommendations

The Nigerian government should prioritize education and allocate sufficient funds to address the systemic challenges facing the sector. Policymakers should develop and implement policies that support teacher training, infrastructure development, and technology integration in schools. Educators should be supported and empowered to provide high-quality education through ongoing professional development and training. The government and private sector should collaborate to provide resources and infrastructure to support education, particularly in rural and underserved areas. Additionally, the government should establish a framework for monitoring and evaluating the effectiveness of educational programs and policies to ensure continuous improvement.

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