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INTEGRATION OF TECHNOLOGY IN LITERACY INSTRUCTION: CHALLENGES AND OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT IN EBONYI STATE

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ABSTRACT

This study focused on Integration of Technology in Literacy Instruction: Challenges and Opportunities for Sustainable Development in Ebonyi State. The study was guided with three research questions in line with research objectives. The population of this study was 4,146 secondary school teachers in the 226 public secondary schools in Ebonyi State. The sample of the study was 377 teachers using Taro Yamane formular, for finite population. Proportionate stratified random sampling technique was used to draw the sample of teachers in Ebonyi State. The instrument for data collection was a structured questionnaire designed by the researcher. To determine the reliability of the instrument, the instrument was administered to 30 teachers and the data collected was subjected to the test of internal consistency using Cronbach Alpha procedure with reliability coefficient of 0.77. Data collected were analyzed using mean (x) and standard deviation to answer the research questions while the hypothesis was tested using the t- test at 0.05 level of significance. The study revealed that: technology integration into literacy instruction positively impacts on transforming students learning interaction in Public Secondary Schools. Secondly: Improvement in digital literacy to employability, enhancement of economic productivity, increases accessibility productivity and enhancement of teachers professional development, promotion of cultural heritages are opportunities for development in integrating of technology in literacy instruction and thirdly funding for procurement of technological facilities, data privacy and security, issues of managing digital footprint, keeping pace with technological advancement and issues associate with parents and community engagement are challenges associated with technology in Public Secondary Schools. Based on the findings, the study recommended that: Ebonyi State Secondary Education Board should collaborate with experts in the usage of technology devices in order to ascertain students' progress in literacy instruction and also Government should initiate mentorship programs that connect teachers on professional development and procure more technology devices in order to create more opportunities educational development.

Keywords: Technology, Literacy Instruction, Challenges, Opportunities, Sustainable Developmen

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Introduction

Integrating technology into literacy instruction presents significant opportunities to enhance students' engagement and learning outcomes, particularly for sustainable development; students face challenges related to access to information, re-training of teachers and addressing the digital device, requiring careful consideration to ensure equitable access to information and effective implementation across diverse contexts. The integration of technology into literacy instruction transforms educational system, creating both challenges and opportunities (Adeleke and Emeachara, 2019). As society becomes increasingly dependent on digital technology, the ability to read and write in a technologically advanced context becomes crucial. This paper investigated the place of technology and literacy instruction, examining the challenges educators face, the opportunities that arise from effective integration, and the implications for sustainable development.

Technology encompasses the tools, devices, and systems created through scientific knowledge to solve problems or enhance tasks. In an educational context, technology includes digital tools such as computers, tablets, software applications, and online platforms used to aid teaching and learning. According to the Aharony and Gazit (2019), technology involves any hardware, software, or digital resources used for teaching, learning, assessment, and operational functions. Technology encompasses the tools, machines, and systems developed through scientific knowledge to solve problems or perform specific functions. This includes everything from computers and software to more advanced devices and applications. According to Udoka (2023) application of scientific principles to create tools and systems that enhance human capabilities and address challenges, ultimately transforming how individuals interact with information. The application of these tools into educational system may likely promote literacy instruction.

Literacy encompasses more than just traditional reading and writing; it includes literacy, and digital literacy. These facets are essential in today's information-rich environment. The goal of literacy instruction is to equip learners with the necessary skills to comprehend, analyze, and create content across various platforms and media formats (Banik and Kumar, 2019). As such, integrating technology into literacy instruction becomes vital for preparing students for future challenges. Literacy instruction refers to teaching methods and practices that aim to develop reading, writing, and critical thinking skills in individuals, particularly students. It encompasses various strategies to improve comprehension and communication abilities. Dolinger, (2019) asserted that literacy instruction is the systematic approach to enhancing an individual's ability to understand and utilize written and spoken language effectively, enabling them to engage with their environment and society meaningfully. Literacy instruction refers to the educational practices aimed at teaching individuals how to read and write, as well as developing their ability to comprehend and critically analyze

texts. This encompasses various components including phonemic awareness, vocabulary development, reading fluency, and writing skills. According to the National Reading Panel (2000), effective literacy instruction combines various methods and strategies, such as phonics, guided reading, and comprehension strategies, diverse needs of learners. Technology integration in literacy instruction might lead to sustainable development.

Sustainable development refers to a mode of human development in which resources use aim to meet human needs while preserving the environment for future generations (Bawack and Kala, 2020). These seek balance between economic growth, social inclusion, and environmental protection. Sustainable development integrates economic viability, social equity, and environmental stewardship to ensure that present needs are met without compromising the ability of future generations to meet their own needs (Ndou, 2021). Sustainable development is the approach to growth and advancement that seeks to balance and environmental needs. Zimu (2020) defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development includes social well-being, which depends on education. Information technology has emerged to spread shared knowledge and it is a primary driving force behind education reforms. The integration of technology into literacy instruction plays a crucial role, particularly in education. Quality education (SDG 4) is foundational when it can contribute positively to society (Baro and Keboh, 2021). By embracing technology in literacy instruction, individual or institutions can: providing equitable access to technology and digital resources can help educational opportunities, ensuring that all learners, regardless of socio-economic status, have the chance to acquire essential literacy skills, digital literacy as a cornerstone of lifelong learning, equipping individuals with the skills to adapt to changing jobs in the markets and personal engagement, encouraging, promotion of innovation and creativity, which are essential for societal progress (Lanning and Mallek, 2017).

The introduction of new technology-assisted learning tools such as mobile devices, smartphone, tablets, laptops, simulations, dynamic visualisations, and virtual laboratories have altered education in schools and institutions. The Internet of things (IoT) is proven to be one of the most cost-effective methods of educating young brains. It is also a robust mechanism for integrating a world-class learning experience for everybody . Educational technology businesses are continually attempting to create novel solutions to expand access to education for individuals who cannot obtain adequate educational facilities (Rafiq, Ali and Khan, 2020). Social media as a learning tool has come a long way. Large numbers of teachers and students use social media as an essential element of the overall e-learning experience. It is a critical venue for exchanging information about crucial topics these days. Aside from the ability to communicate information anywhere, at any time, social

media sites are also a fantastic source of producing networking possibilities to establish social activities and possibly new jobs.

Technologies are a powerful instrument that help improve education in various ways, such as making it easier for instructors to generate instructional materials and providing new methods for people to learn and collaborate (Moyo and Okemwa, 2022). A new era has arrived with the Internet's worldwide reach and many intelligent devices connected to it. Technology has continued to play an essential role in delivering education to children outside the classroom. Digital learning fosters creativity and gives students a sense of success, encouraging additional learning by thinking outside traditional techniques. These provide easy access to information, easy retention of information, increased storage of information, and improved presentation of information; education became more interactive, easier sharing of knowledge and increased enthusiasm in learning. With today's technological growth, instructors must learn to utilize various gadgets, such as smartphones and tablet computers, or face marginalization. Teachers must also harness all available online resources to ensure that their materials are alive, engaging, and up to date. Technology is more than just playing video games and viewing animated films (Banik and Kumar, 2019). The advantages are determined by how students, parents, and teachers use technology to improve education. When technology is used effectively for instructional reasons, the educational experience improves, and students become interested. Making e-learning systems compatible with new smart devices such as phones and tablets has been a significant element in the ease of access and faster uptake of digital learning (Adeleke and Emeachara, 2019). Specialized learning goods, such as animation, games, or AI-powered systems designed exclusively for edutainment, are also included. Technology-enabled innovations have helped facilitate learning across age groups and topics. The importance of Big Data and the application of analytics to learning was an essential but generally overlooked part of Education technologies. Schools and educational institutions realize the value of comprehensive student and instructor performance data as they extend their usage of virtual classrooms, e-learning platforms, and online exams. However, there are not without challenges.

One of the most pressing challenges is access to the digital device is the gap between those who have easy access to digital technology and those who do not create a problem. Economic disparities can result in unequal access to technological resources, affecting students' ability to engage with Schools in low-income areas who often struggle with outdated equipment, hindering their ability to provide effective technology-enhanced literacy instruction (Udoka, 2023). Effective integration of technology requires teachers to be proficient in both literacy instruction and technological tools. However, many educators lack adequate training and ongoing professional development. The FGN 2004 in the National Policy on Education 2004:5which is on need of technology and

promised to train manpower in technology to foster education. This however seem contrary as most teachers are yet to be trained. Another challenge according to Nweke, (2022) lies in aligning technology use with literacy curricula. Educators must navigate state standards and assessments while ensuring that technology enhances learning rather than distracts students from learning objectives. Moreover, the fast-paced evolution of technology can make it difficult to keep curricular resources up-to-date and relevant. The increased use of technology in education raises concerns about excessive screen time and its impact on students' health and well-being. Most people believe that boys are more attributed to technology than girls. Other believe that girls perform better than boys in language. Others, yet believe both boys and girls are good in languages and are attracted to digital devices (Nweke, 2022). Balancing technology use with traditional literacy practices is vital to prevent negative effects on students' physical and mental health. But in all, the integration of technology in literacy instruction creates several opportunities. Udoka (2023) states that technology significantly enhance student engagement through interactive and platforms allow for creative storytelling, collaborative projects, and instant feedback, capturing students' interest and motivate them to participate actively in their learning. It provides unprecedented access to a wealth of resources, including e-books, articles, educational games, and online courses. This abundance of materials supports differentiated instruction, allowing educators learning needs and preferences effectively. Digital students, facilitate communication with peers, educators, and experts worldwide (Ndou, 2021). This connectivity encourages the sharing of ideas and perspectives in learning experiences and promote cultural awareness. Integrating technology into literacy instruction fosters critical thinking and problem-solving skills as students navigate various digital platforms. Learning to evaluate the credibility of sources, synthesize information, and produce original content prepares students for the complexities of modern life. Incooperation of technology to literacy instruction no doubt would impact effectively on students' academic performance. The crux of this paper is to assess the Integration of Technology in Literacy Instruction: Challenges and Opportunities for Sustainable Development.

Statement of the Problem

One of the most significant challenges in education is the disparity in access to technology among students. Many students do not have access to reliable internet or devices, leading to inequalities in learning opportunities. This digital device can exacerbate existing educational inequities. Many educators lack the training necessary to effectively integrate technology into their literacy instruction. Due to lack of adequate professional development, teachers struggle to utilize technological tools in learning, leading to poor students' academic performance. So, integrating technology into literacy instruction often requires curriculum adjustments. Aligning technology with learning objectives seem to be complex, and educators seem to find it challenging. There is a risk that educators who are knowledgeable in technology may rely too

heavily on them and this may undermine traditional literacy skills. This over-reliance led to superficial engagement with texts and a decline in critical thinking skills. Notwithstanding, evaluating the effectiveness of technology-enhanced literacy programs are totally difficult. Traditional assessment methods, do not adequately capture the benefits of technology, making it hard to measure success and adjust strategies. It is on the basis of this, that this paper is poised to investigate the challenges and opportunities associate with integration of technology in literacy instruction in Ebonyi State.

Purpose of the Study

The main purpose of the study is to assess the Integration of Technology in Literacy Instruction in Ebonyi State. Specifically, the study sought to:

1. Ascertain the impact of technology integration in students learning outcome in Public Secondary Schools in Ebonyi State
2. find out opportunities associated with the integration of technology in literacy instructions in Public Secondary Schools in Ebonyi State
3. ascertain the challenges associate with technology integration in students learning interaction in Public Secondary Schools in Ebonyi State

Research Questions

The following research questions guided the study.

1. What are the impacts of technology integration in transforming students learning outcome in Public Secondary Schools in Ebonyi State?
2. what are the opportunities development associate with the integration of technology in literacy instructions in Public Secondary Schools in Ebonyi State?
3. What are the challenges associated with technology integration in students' learning interaction in Public Secondary Schools in Ebonyi State?

Research Hypothesis

The following null hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference in the mean ratings of male and female teachers on the impact of technology integration on students' learning outcome in Public Secondary Schools in Ebonyi State

Research Method

A descriptive survey research design was adopted for the study. Descriptive survey design consist of studies in which data are collected from a small sample of a large population to enable the researcher describe in a systematic manner and interpret the characteristic features and facts about things that exist. A survey is a descriptive study when it seeks to document and describe what exists or the present status of existence or absence of what is being investigated. The study was carried out in Ebonyi State. The population of this study was 4,146 secondary school teachers in the 226 public secondary schools in Ebonyi State according to statistical information obtained from the state's Secondary Education Board, (SEB, 2024). The breakdown has it that 2374 are male teachers and 1772 female teachers. The sample for data collection comprised 377

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respondents made up of male and female teachers using Taro Yamane formular, for finite population. Proportionate stratified random sampling technique was used to draw the sample of male and female teachers in Ebonyi State. The instrument for data collection was a structured questionnaire designed by the researcher, titled 'Integration of Technology in Literacy Instruction: Challenges and Opportunities for Sustainable Development Questionnaire (ITLICOSDQ). To determine the reliability of the instrument, 30 copies of the questionnaire were trial tested in public secondary schools in Enugu State which was outside the study area. The instrument was administered to 30 teachers and the data collected was subjected to the test of internal consistency using Cronbach Alpha procedure with reliability coefficient of 0.77. The data collected for this study were analysed using mean and standard deviation to answer the research questions while the hypothesis was tested using the t- test at 0.05 level of significance. Any item with a mean equal to or greater than 2.50 was accepted, while those below 2.5 were rejected. That is, on a four-point scale of (Strongly Agree (SA = 4), Agree A = 3), Disagree (D = 2), and Strongly Disagree (SD = 1).

Presentation of Results

Research Question One: What are the impacts of technology integration on students' learning outcome in Public Secondary Schools in Ebonyi State?

Table 1: Mean and standard deviation on the impacts of technology integration in transforming students learning outcome in Public Secondary Schools in Ebonyi State

S/N	Items	$\bar{X}$	SD	Decision
1	Technology integration in learning process improve learners' digital literacy skills	2.94	0.66	Agree
2	Integration of technology increase accessibility for diverse learners	2.95	0.67	Agree
3	Technology integration in learning process improve reading comprehension	2.75	0.62	Agree
4	Technology integration personalized learning experience	2.19	0.39	Disagree
5	Integration of technology in learning process enhances effective learning	2.76	0.63	Agree
6	Enhances student engagement in a given task	2.68	0.62	Agree
7	Makes learning process easier and faster	2.75	0.62	Agree
	Grand Mean	**2.71**		**Agree**

Table 1 showed that the respondents agreed to high extent in item 1, 2, 3, 4, 5, 6 and 7 with mean score of: 2.94, 2.95, 2.75, 2.19, 2.76, 2.68 and 2.75 respectively that, technology integration in learning process improve learners' digital literacy skills, increase accessibility for diverse learners, improve reading comprehension, enhances effective learning, enhances student engagement in a given task and makes learning process easier and faster. Only item 4 which was on personalized learning experience disagreed on the item statement. But with a grand mean score of 2.71 which above cut off point, it was concluded that technology integration into literacy

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instruction positively impact on transforming students learning outcome in Public Secondary Schools.

Research Question Two: what are the opportunities associated with the integration of technology in literacy instructions in Public Secondary Schools in Ebonyi State?

Table 2: Mean and standard deviation on the opportunities associated with integration of technology in literacy instructions in Public Secondary Schools

S/N	Items	X	SD	Decision
8	It improved digital literacy and employability	3.11	.66	Agree
9	It enhances economic productivity	3.20	.49	Agree
10	It increases accessibility productivity	2.66	.50	Agree
11	It enhances teachers' professional development	3.11	.66	Agree
12	It helps in the preservation and promotion of cultural heritages	2.86	.67	Agree
13	It helps in increasing access to cultural resources	1.99	.56	Disagree
	Grand Mean	**2.82**		**Agree**

Table 2 showed that the respondents agreed that improvement in digital literacy and employability, enhancement of economic productivity, increase accessibility productivity, enhancement of teachers' professional development, promotion of cultural heritages are all opportunities associated with development in integrating of technology in literacy instruction as recorded on item, 8, 9, 10, 11, 12 and 13 which scores a grand mean of 2.82.

Research Question 3: What are the challenges associated with technology integration in students learning outcome in Public Secondary Schools in Ebonyi State?

Table 3: Mean and standard deviation on the challenges associated with technology integration in students learning outcome in Public Secondary Schools

S/N	Items	X	SD	Decision
14	Funding for procurement of technological facilities are challenges associated with technology integration	2.71	0.40	Agree
15	Data privacy and security are challenges associated with technology integration	3.02	0.49	Agree
16	Issues of managing digital footprint are challenges associated with technology integration	2.51	0.46	Agree
17	Keeping pace with technological advancement are challenges associated with technology integration	3.36	0.53	Agree
18	Lack of adequate budgeting are challenges associated with technology integration are challenges associated with technology integration	3.47	0.53	Agree
19	Issues associate with parents and community engagement are challenges associated with technology integration	2.57	0.47	Agree
	Grand Mean	**2.94**		**Agree**

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Table 3 showed that the respondents agreed that funding for procurement of technological facilities, data privacy and security, issues of managing digital footprint, keeping pace with technological advancement, lack of adequate budgeting and issues associate with parents and community engagement are challenges associated with technology integration in transforming students learning interaction in Public Secondary Schools as recorded on item, 14, 15, 16, 17, 18 and 19 which scores a grand mean of 2.94

Research Hypothesis: There is no significant difference in the mean ratings of male and female teachers on the impacts of technology integration on students learning outcome in Public Secondary Schools in Ebonyi State

Table 4: t-test of difference in the mean responses of male and female teachers on the impacts of technology integration in transforming students learning outcome in Public Secondary Schools in Ebonyi State

Items	Category of Respondents	N	Mean	SD	df	t	P-Value	Decision
1	Male Teachers	116	3.21	0.95	219	1.407	0.160	Not Significant
	Female Teachers	105	3.35	0.83				
2	Male Teachers	116	3.38	0.75	219	0.290	0.772	Not Significant
	Female Teachers	105	3.40	0.68				
3	Male Teachers	116	3.39	0.64	219	0.040	0.968	Not Significant
	Female Teachers	105	3.39	0.56				
4	Male Teachers	116	3.41	0.65	219	0.250	0.803	Not Significant
	Female Teachers	105	3.39	0.59				
5	Male Teachers	116	3.08	0.85	219	1.286	0.199	Not Significant
	Female Teachers	105	3.21	0.85				
6	Male Teachers	116	3.16	0.64	219	0.377	0.707	Not Significant
	Female Teachers	105	3.13	0.50				
7	Male Teachers	116	3.21	0.66	219	.0104	0.917	Not Significant
	Female Teachers	105	3.20	0.63				

Result on Table 5 revealed that the mean ratings of male and female teachers on impacts of technology integration on students' learning outcome in Public Secondary Schools in Ebonyi State was not significant as the items as the p-value is greater than alpha level of 0.05. This indicate that male teachers and female teachers has the same opinion on the impacts of technology integration in transforming students learning interaction in Public Secondary Schools in Ebonyi State.

Discussion of Findings

Result revealed that technology integration positively impacts in transforming students learning interaction in Public Secondary Schools. As the respondents agreed that: technology integration in learning process improve learners' digital literacy skills,

integration of technology increase accessibility for diverse learners, Technology integration in learning process improve reading comprehension, integration of technology in learning process enhances effective learning, it enhances students' engagement in a given task and makes learning process easier and faster.

The result is in line with the findings of Adeleke and Emeachara, (2019) who asserted that integration of technology into literacy instruction has transformed the educational system, creating both challenges and opportunities. As society becomes increasingly dependent on digital, the ability to read and write in a technologically advanced context is crucial. In the case of opportunities development in integrating of technology in literacy instruction: the integration create opportunities by; improved digital literacy and employability, enhances economic productivity, increase accessibility productivity, enhances teachers' professional development, preservation and promotion of cultural heritages and increase access to cultural resources.

The finding is consistent with the views of Mojapelo, (2018) observed that the integration of technology in literacy instruction has significantly improved digital literacy among students. Digital literacy encompasses a range of skills needed to navigate, evaluate, and create information using digital technology. With the prevalence of digital tools, educators can incorporate various multimedia resources such as interactive e-books, educational apps, and online research databases into their curricula. This not only enhances students' reading and writing skills with the necessary competencies to participate in a technology-driven society. As students engage with these tools, they, learn to discern credible sources from misinformation, and become proficient in the digital communication skills needed for both academic and professional success. Technology integration within literacy instruction has broader economic implications. By fostering a workforce adept in digital skills, educational institutions can contribute to enhanced economic productivity. Students who acquire strong digital literacy are better prepared for today's job market, where many employers seek candidates who Moreover, when students become proficient in utilizing digital tools for learning, they foster creativity and innovation, which are key drivers of economic growth. The educational system thus plays preparing future employees who can leverage technology to improve processes, drive efficiency, and contribute to overall economic development.

The results of research question three on the challenges associated with technology integration in transforming students learning interaction in Public Secondary Schools. These were revealed as: funding for procurement of technological facilities, data privacy and security, issues of managing digital footprint, keeping pace with technological advancement, lack of adequate budgeting and issues associate with parents and community engagement are challenges associated with technology integration in transforming students learning interaction in Public Secondary Schools.

The findings are in line with Ndou, (2021), who asserted that one of the primary challenges in integrating technology into literacy instruction is funding. Many educational institutions face budget constraints that limit their ability to invest in new technologies, software, and training for educators. Effective technology integration requires more than just purchasing devices; it also necessitates ongoing professional development for teachers, adequate maintenance of technological infrastructure, and the procurement of up-to-date educational resources. In support of the findings Mojapelo, (2018) observed technology raises privacy and security and that Schools often collect vast amounts of personal information from students, ranging from academic performance to behavioral data. With the increasing use of educational apps and online and misuse of sensitive information rises.

Conclusion

In conclusion, the findings present a compelling case for the integration of technology into literacy instruction within public secondary schools. The positive impact of integrating technology in literacy instruction is of utmost importance in the global world especially in Nigeria schools and more in Ebonyi State. Furthermore, the opportunities for development created through technology integration are significant. Students can access a wealth of resources, collaborate with peers, and develop critical thinking skills through diverse digital platforms, ultimately contributing to their academic success and personal growth. However, it is crucial to acknowledge the challenges that accompany this technological shift. Issues such as funding constraints, data privacy concerns, and the need for effective management of digital footprints cannot be overlooked.

Recommendations

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

1. both teachers and students should avail themselves the opportunity to learn modern technologies to facilitate literacy instruction
2. Since there are many opportunities associated with integrating technology into literacy government should initiate mentorship programs that connect teachers on professional development and procure more technology devices in order to create more opportunities development.
3. Government should implement and develop technology plans for schools by procuring facilities for technology such as computer, electricity and the likes to enhance literacy in schools.
4. Male and female should be developed on the use of modern technology through training and retraining of teachers via workshops and seminars.

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