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Resilient Pedagogy Tool: Influence of E-Learning on Students' Scholarly Learning Outcomes among Senior Secondary School Students

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Abstract

This study investigated the resilient pedagogy tool: influence of E-learning on students' scholarly learning outcomes among senior secondary school students. The study adopted a correlational research design. A simple random sampling technique was utilised to select three hundred (300) participants aged 11-18 years. The instrument used to collect data is a questionnaire, while the average scores of each student were utilised to measure scholarly learning outcomes. The reliability coefficient of the E-learning scale is 0.81. Data were analysed using Pearson's Product moment correlation statistical tool. The findings revealed that E-learning had a significant influence on the scholarly learning outcomes of secondary school students and a significant moderating impact of gender in the relationship between E-learning and scholarly learning outcomes. The findings further revealed that female senior secondary school students engage more in E-learning than their male counterparts, as divulged in the average difference in the study. Based on the findings, it was concluded that E-learning influences the scholarly learning outcomes of secondary school students. However, it was recommended, among others, that educators should use new technology to stimulate students' interest in effective E-learning.

Keywords: Resilient Pedagogy Tool; E-Learning; Learning Outcomes; Scholarly Learning Outcomes; Students; Senior Secondary School.

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Introduction

The importance of e-learning, also known as electronic learning, in enhancing learner outcomes cannot be over-emphasised. Individual's metacognitive experiences and views are the foundation of their ability to function at various levels, and the acquisition of this experience holds significance in advancing cognitive abilities and fundamental skills (Odofin, Urien & Obro, 2024). Students' learning outcomes are significant in education and the learning process. It has become a predictor of a child's future in today's fiercely competitive environment. It is knowledge a student attains to achieve their short or long-term educational objectives/goals. It implies the total outcome of both the teachers' and students' efforts in day-to-day learning in school work (Odofin & Okorodudu, 2019). Scholarly learning outcomes are the knowledge of or competence attained in school responsibilities/tasks as determined by standardised assessments and represented by a grade measured by standardised tests and expressed in a grade. It is the knowledge that students obtain in school subjects, generally determined by test scores given by the teacher. Therefore, to achieve a strong education in Nigeria, there is a need to develop the Internet to make learning easy and possible even if students cannot interact physically with the teachers because of distance restrictions and other reasons.

The phenomenon of E-learning has experienced growth within the higher education sector. Literature indicates that a vital element of online education quality is the assurance of learner involvement (Rajabalee, Santally, & Rennie, 2020). E-learning has become a fundamental or vital component/element of the educational environment, acting as the principal driver of enrolment increase in higher education. Digital technology is one of the ways that can be used to get students engaged and excited about learning. Students vary in different aspects of life, such as different socio-economic backgrounds, cultures, brains, families, and personality types; with digital usage, they are more likely to be engaged, work together, get excited, and direct learning in and out of the classroom (Odofin, 2020). The increasing student online population in education necessitates that instructors/teachers and instructional designers recognise the significance of cultural aspects affecting students' learning outcomes or experiences in digital settings (Kumi-Yeboah, 2018).

Given that most students have access to technology, instructors have found it challenging to completely engage them in the classroom, leading to the development of various new E-learning cognitive assessment methods. These tools frequently incorporate cognitive learning strategies into an evaluation to improve learning rather than only quantifying it (Shaw, MacIsaac, & Singleton-Jackson, 2019). Recently, flipped learning has garnered attention as an alternative pedagogical approach in higher/tertiary education (Chun & Heo, 2018). Umek, Aristovnik, Tomaževic, and Keržic (2015) assert that e-learning methodologies in higher education are becoming progressively prevalent. In specific colleges, e-learning has entirely supplanted conventional teaching methods, potentially resulting in academic burnout.

Compared with traditional learning, E-learning significantly reduces the time required to collect information. It also offers access to online resources, databases, periodicals, journals, and other material. If a student has trouble understanding part of the coursework, finding tips could be made easier through immediate access to supplementary, unlimited, and primarily free material online. It reduces the unnecessary load of study material that may not be directly effective for students learning and enhances the efficiency of access to study material. Immense open online programmes/courses have developed as a new or modern way of obtaining knowledge and are more useful when integrated with classroom technologies (Bralić & Divjak, 2018). Numerous research studies have been conducted to demonstrate the impact of e-learning on academic learning results. These studies demonstrated the significance of e-learning on

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students' scholarly learning outcomes at all educational levels. Ming-Hung, Huang-Cheng and Kuang-Sheng (2017) surveyed digital learning and learning motivation and outcomes. The research results conclude that digital learning positively affects learning motivation more than traditional teaching. Fayomi, Ayo, Ajayi, and Okorie (2015) investigated the impact of E-learning in facilitating scholarly learning outcomes in schools. The study's outcome shows how much e-learning helps scholarly learning outcomes and self-development, improving the learning processes and excellent scholarly learning outcomes. Similarly, Zare et al. (2015) discovered that the learning and memory of students educated using multimedia techniques exceed those instructed using the traditional method/approach.

Amaoge and Igwebuike (2016) examined how undergraduates assessed their online awareness and usage. The study revealed that all respondents know and use the Internet. The study also confirmed the self-assessed impact of the Internet on students' scholarly learning outcomes. Jakobsone and Cakula (2015) sought to gain a fresh viewpoint on exchanging information and a deeper conception of the future of automated learning support systems that incorporate new technical possibilities. In addition to encouraging effective knowledge management technologies, the researchers discovered that the information system's analysis as e-learning support platform enhanced the quality of knowledge flow and offered suggestions for promoting work-based learning. Islam (2013) proposed a model on the usefulness and role of E-learning in improving students' scholarly learning outcomes. The result revealed that students perceived academic performance could predict the proper utilisation of e-learning. Ahmad (2012) identified factors or elements that influence the utilisation of e-learning at Jordan High School. The study investigated two universities in Jordan involving students' and staff. The study's findings exposed that e-learning facilities improve the technological skills of staff and students. Based on this background, this study investigated the resilient pedagogy tool: influence of E-learning on students' scholarly learning outcomes among senior secondary school students.

The resilient pedagogy tool is an instructional method that prioritises the design of disciplines/ subject and learning experiences to withstand and adapt to disruptions, highlighting flexibility, feedback, and interactions rather than conventional assignments and grading. The resilient pedagogy tool is an online educational resource. It gives the capability to make purposeful and effective changes to teaching methods in retort to changes in the surrounding environment or circumstances (Chow et al., 2020). A resilient pedagogy tool is an educational instrument that allows teachers to create learning experiences that can adjust to varying circumstances and interruptions. It is a teaching strategy that considers that students, teachers, and subject materials must constantly engage in unique interactions in today's ever-changing classrooms (Clum et al., 2022). Teachers who utilise resilient pedagogy tools/strategies may reconsider how educational experiences are planned based on a unfathomable understanding of context (Schwarzman, 2020). Utilisation of a resilient pedagogy tool impacts the subject content and delivery format, eventually emphasising the nature of interactions between teachers/educators and learners.

Concept of E-Learning

The emergence and development of new technologies have created tremendous opportunities/openings for students all over the globe regarding their socialisation advancement and cultural awareness. Many learning institutions worldwide and Nigeria have transformed their teaching/learning activities through technology platforms. Distance teaching and learning (Virtual teaching/learning), virtual seminars, symposiums, workshops, and

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conferences have become popular, and students and teachers can effortlessly interact through e-learning.

E-learning, or electronic or online learning as a resilient pedagogy tool, involves all teaching/learning practices done electronically or online through various media. This form of education uses information and communication technology (ICT) or other online gadgets to advance teaching and learning (Baczek et al., 2020). E-learning also refers to deploying ICT to grant students access to online educational resources. Doculan (2016) defines E-learning as using technology to boost teaching/learning activities. Learning activities occur online, eliminating physical interaction between students/learners and teachers. This kind of instruction can be conducted or accessed in any environment suitable for both parties. A resilient pedagogy tool like E-learning can be received in the coziness of the home, the shop, the church, or even on the school premises without the teacher and the students coming together as they would in a conventional class.

E-learning cannot be done except through technology utilisation. The primary aim of using e-learning is to provide students with a flexible and interactive learning environment, which could be a prototype of a conventional classroom environment. Some of the technologies for e-learning are as follows: Zoom, Google Team, WhatsApp, Office 365, Webex, Google Meet, and Webnar (Doric, Blagojevic, Papic & Stankovic, 2020). Nigeria was not left out as most schools did teaching/learning through many E-learning handles for example Zoom, Television, Radio, and WhatsApp platforms (Oboh & Oboh, 2020). The state government usually organises e-learning for lower upper basic and secondary school classes through television and radio. Thus, in delivering lectures via technologies, the options could be audio-only or audio-visual technologies.

Categories of Technology Handles for E-Learning Approach

(a) Audio technology handles
(b) Audio-virtual technology handles.

- **Audio technology handles for E-learning:** these handles require only a voice projector. Here, students will not be privileged to see the teacher; they can only listen to the lecture's voice presentation. The audio lecture presentation could be pre-recorded and played to the students; here, the students cannot ask the teacher questions in areas where they need further clarification. Alternatively, the audio lecture presentation can be programmed so that the students can listen to live lecture presentations, allowing them to ask the teacher questions and receive feedback from the teacher equally. Audio lecture presentations could be done through WhatsApp platforms, and free conferencing can also be utilised in this teaching approach.
- **Audio-visual technology handles E-learning:** under this category, the teacher and the students can see and listen to each other during teaching and learning. It is comparable to the conventional classroom experience, except the students are not seated together while receiving lectures. The teacher sees the students and can address them by calling their names and demanding their active participation. Some modern audio-visual technologies for e-learning include Google Team, Office 365, Zoom, WhatsApp, Webex, Google Meet, Webnar, and free conferencing if the video and audio systems are turned on.

Benefits of E-Learning as a Resilient Pedagogy Tool

Adopting the resilient pedagogy tool of E-learning approach benefits the government, the schools, the teachers, and the students.

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- E-learning gives room for teaching/learning in the comfort of the students and teachers. The students and teachers can give and receive lectures in the luxury of their homes, and this could minimise distractions that could have arisen from sitting with classmates in a conventional classroom.
- E-learning enables students/learners and teachers to deliver and access lectures from any location whenever or day. Neither teachers nor students will be prohibited from travelling outside their residence to deliver or attend lectures. Distance, therefore, is not a barrier to E-learning.
- E-learning allows the students to listen to pre-recorded learning materials over and over for better understanding and Assimilation.
- Learning online can be fun and motivating for the students.

Hypotheses

The following hypotheses were tested in the study:

HO_1: There is no significant relationship between e-learning and the scholarly learning outcomes of secondary school students.

HO_2: There is no significant relationship between e-learning and the scholarly learning outcomes of secondary school students by on gender.

Methods

This study adopts the correlation survey research method as the study design. The survey method is considered appropriate for the study because the participants' opinions on the issue related to E-learning and students' scholarly learning outcomes are measured. Items on a four-point scale were used to measure the students' response to issues related to E-learning usage, while the students' average scores were used to measure students scholarly learning outcomes. The study population comprises all secondary school students in Ethiope East local government area in Delta State. A total of 300 students were randomly selected for the study. They were selected from 6 secondary schools purposively chosen from among the secondary schools in Ethiope East local government area of Delta state. The students comprise senior secondary school students. In each school, 50 senior students were selected. Data was generated using a questionnaire administration, which contained two segments. The first segment is in line with the demographic characteristics of the participants. The second segment focused on 15 issues relating to e-learning.

The average students' scores were used to measure their scholarly learning outcomes. Experts in measurement and evaluation validated the self-designed questionnaire through vetting, correction, and approval. To obtain the reliability of the questionnaire a reliability test was done using the Cronbach alpha test, which helps to measure the consistency accuracy of the instrument. A reliability coefficient of 0.81 was obtained, confirming the consistency and accuracy of the questionnaire. The researchers personally administered the questionnaire to the participants in the selected schools with the help of one research assistant. The participants were given up to thirty minutes to respond to the questionnaire, and it was retrieved from them the same day to avoid participants influencing one another in their response to the instrument. The data collected was analysed using Pearson's Product-Moment correlation and Fisher's Z statistics.

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Results

Ho1: There is no significant relationship between E-learning and students' scholarly learning outcomes.

Table 1: PPMC analysis of the relationship between E-learning and scholarly learning outcomes of secondary school Students

Variables	No	r	R^2	r^2%	df	F	Probability	Remark
E-learning Academic Performance	300	0.116	0.014	1.4	1	14.312	0.000	Significant

Table 1 indicates the result of regression statistics performed to investigate the relationship between E-learning and scholarly learning outcomes of secondary school students. The calculated F-value is 14.312, and the p-value is 0.000, less than the alpha level of 0.05. Consequently, the null hypothesis is rejected. This implies a relationship exists between E-learning and the scholarly learning outcomes of secondary school students.

Ho2: There is no significant moderating impact of students' gender in the relationship between E-learning and students' scholarly learning outcomes.

Table 2: Multiple correlation and Fisher's Z statistics of the moderating influence of students' gender on the relationship between E-learning and students' scholarly learning outcomes

Gender	Variables	*N*	*R*	Fisher's Z	Remark
Male	E-learning Academic achievement	120	0.557	5.380	Significant
Female	E-learning Academic achievement	180	0.767		

Table 2 shows the result of Pearson's correlation and Fisher's Z statistics, which was utilised to assess the moderating effect of gender on the relationship between E-learning and scholarly learning outcomes of secondary school students. The result shows that male students had a coefficient (*R*) of 0.557 while female students had a coefficient (*R*) of 0.767. The fisher-z (z_{obs}) is 5.380, which is greater than 1.96. The correlation coefficients are statistically significantly different. Hence, the null hypothesis is rejected, which means there is a significant moderating impact of gender in the relationship between E-learning and the scholarly learning outcomes of secondary school students.

Discussions

This study explored the resilient pedagogy tool of E-learning's influence on secondary school students' scholarly learning outcomes. The hypothesis of no significant association between e-learning and scholarly learning outcomes of secondary school students was rejected. The study discovered a significant relationship between e-learning and students' scholarly learning outcomes. This finding supports Alabi (2021), who reported a favourable link between E-learning and academic learning results among secondary school students. Ming-Hung, Huang-Cheng and Kuang-Sheng (2017) also found out digital learning presents better positive effects on learning than traditional teaching does. Similarly, this finding agrees with Mothibi (2015), who found a relationship between E-learning and students' scholarly learning outcomes. The findings align with those of Fayomi, Ayo, Ajayi, and Okorie (2015), who examined E-learning's effects on enhancing students' scholarly learning outcomes, resulting

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in improved learning processes and high students' scholarly learning outcomes. Similarly, Oye, Salleh and Iahad (2012) discovered that E-learning can positively impact students' scholarly learning outcomes. Zare et al. (2015) found that the learning and memory of students educated in multimedia methods are more than those educated in traditional methods.

Data relating to hypothesis two indicated a positive significant moderating impact of gender in the relationship between E-learning and students' scholarly learning outcomes among secondary school students. This finding agreed with Johnson (2011), who found that higher levels of interaction and general sociability among females were an advantage in E-learning courses and were likely to lead to enhanced students' scholarly learning outcomes for females than males.

Conclusion

In light of the data presented above, the following conclusions were made: a significant positive relationship between E-learning and students' scholarly learning outcomes existed, and a significant positive moderating impact of gender in the relationship between E-learning and students' scholarly learning outcomes of secondary school students existed.

Recommendations

Based on the study findings and conclusion, the following recommendations are made:

1. E-learning teaching strategy should be utilised in secondary school classrooms to improve students' scholarly learning outcomes.

2. Educators should use appropriate technology to stimulate students' interest in effective online learning.

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