UNDERGRADUATES' DIGITAL LITERACY SKILLS AS FACTORS FOSTERING LEARNING SCIENCE IN OGUN STATE, NIGERIA

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ABSTRACT

The study examined undergraduates' digital literacy skills as factors that fostering learning science in Ogun state, Nigeria. Two research questions and two null hypotheses were answered and tested. A descriptive survey research design was used. The population of this study comprised undergraduates of Educational Technology at Tai Solarin University of Education (TASUED). Eighty undergraduates were selected as sample size of the study using stratified sampling technique. A researchers' designed instrument tagged Undergraduates' Digital Literacy Skills and Learning Science Questionnaire (DLSLSQ) was used for data collection with reliability coefficient 0.92 Frequency counts and percentages were used for presenting demographic characteristics of the respondents. Descriptive statistics of mean and standard deviation were used for answering research questions. Hypotheses were tested using inferential statistics of regression analysis and correlation (PPMC). The findings of the study revealed that the level of undergraduates' digital literacy skills for learning science in Ogun state was moderate. Difficulty with abstract concepts, a heavy content load, inadequate digital skills by the teachers and students, poor practical applications, low level of digital infrastructure, inadequate resources, and lack of qualified teachers were among the issues confronting the effective learning science among undergraduates in Ogun state (3.12 > 2.50). There was significant influence of digital literacy skills on undergraduates' learning science in Ogun state. There was significant relationship between digital literacy skills and undergraduates' learning science in Ogun state (r = 0.429, p <.05). It was recommended that it is essential to provide enhanced digital tools, adequate access to technology, and effective digital literacy training for undergraduates in universities. Strengthening digital literacy initiatives, enhancing instructional strategies, improving infrastructure and access, providing comprehensive teacher training, and fostering collaboration among teachers are also recommended.

Keywords: *Undergraduates, digital literacy skills, learning science.*

Introduction

Learning science is an interdisciplinary field that studies how undergraduates learn and how to improve learning experiences. It draws on insights from

cognitive science, educational psychology, computer science, and other fields to understand the cognitive and social processes involved in learning. The goal is to use this knowledge to design more effective learning environments and practices. According to Okpa (2025), key aspects of learning science include integrating of knowledge from various fields like cognitive science, educational psychology, computer science, among others, investigating how undergraduates' cognitive processes (thinking, memory, problem-solving) and social interactions and the ultimate aim is to apply these to create more effective learning environments and practices in various settings, such as schools, workplaces, and online platforms. Learning science is possible in both formal settings like classrooms and informal settings like museums, homes, and online communities. Learning science applies is also informs the design of curriculum, instruction, and educational technologies to enhance learning outcomes both formal settings like classrooms and informal settings like museums, homes, and online communities. It also informs the design of curriculum, instruction, and educational technologies to enhance learning outcomes.

Ingale (2024) reiterated that learning science is useful through informing educational practices by understanding how undergraduates learn, help educators design more if undergraduates had acquired necessary digital literacy skills. Undergraduates' digital literacy skills extend beyond mere technological interaction to include problem-solving, analytical thinking, and the ability to evaluate digital content critically. In an increasingly interconnected world, digital literacy skills have become essential for personal, academic, and professional success. These skills enable undergraduate to navigate the digital landscape effectively, ensuring they can communicate, research, and engage with digital tools responsibly and informally. Afolabi and Afolabi (2025), stated that the ability to critically assess online information, adapt to evolving technologies, and collaborate through digital platforms is no longer optional but necessary for undergraduates. Digital literacy skills are a broad range of competencies that enable undergraduates to interact with digital technologies effectively and responsibly. These skills encompass more than just technical proficiency; they also involve critical thinking, ethical considerations, and the ability to communicate effectively in digital environments. Digital literacy consists of several key pillars: staying up to date with emerging technologies, communicating effectively online, managing digital content, and leveraging digital tools for collaboration. It extends beyond mere technological interaction to include problem-solving, analytical thinking, and the ability to evaluate digital content critically. Digital literacy skills empower students to fully engage with digital resources, ensuring they can make informed decisions, safeguard their privacy, and contribute positively to the digital world (Adenariwo, 2022).

Jatto and Diyaolu (2021) opined that understanding the impact of technology on education further emphasizes the role digital fluency plays in shaping how undergraduates learn, think, and collaborate. According to Jotangia (2020), there are four reasons why digital literacy skills are beneficial for undergraduates these includes; encourages individual learning, fosters independent problem-solving and adaptability, develops the ability to research and navigate new technologies, enhances memory and knowledge

retention, provides varied and dynamic ways of acquiring knowledge, reinforces understanding through multimedia formats such as videos, simulations, and interactive exercises, encourages communication and teamwork, enables students to collaborate effectively in virtual spaces, fostering teamwork and cross-cultural interactions, and acquisition of essential skills for lifelong learning. These skills allow undergraduates to engage in meaningful discussions and collaborate with diverse teams in professional and academic settings. Supports flexible teaching strategies; digital literacy allows adaptive teaching methods catering to diverse learning needs. Technology-enabled education ensures students can access personalised educational content suited to their unique learning styles and paces.

Kalsoom et al. (2021) reiterated that undergraduates need digital literacy skills for them to fully adopt learning of science in their field of endeavor and such skills includes technical, independent skills research, media literacy skills, digital citizenship skills as well as communication and collaboration skills. Technical skills include the ability to operate computers, use word processing software, manage digital files, create presentations, and navigate the internet effectively. Mastering these skills ensures students confidently engage with digital tools in academic and professional environments. In addition, technical skills encompass knowledge of operating systems, basic coding principles, and the ability to troubleshoot common technological issues. Independent research skill involves using search engines, online databases, and academic sources to gather credible information. It also includes evaluating the accuracy and relevance of digital content to make well-informed decisions. They empower undergraduates to become self-sufficient learners, enabling them to access and analyse digital materials for academic, professional, and personal growth. Media literacy skills, undergraduates with strong media literacy skills can discern credible sources, identify bias, and interpret digital messages effectively. In an era of digital media saturation, media literacy helps undergraduates navigate vast amounts of content, differentiating between factual information and misleading narratives. Additionally, media literacy promotes ethical engagement with digital content, encouraging responsible sharing and constructive online discussions.

Digital citizenship encompasses understanding digital rights, respecting intellectual property, practicing online safety, and maintaining a positive digital presence. By fostering digital citizenship, students contribute to a respectful and inclusive online community. Also, this skill includes understanding the impact of online actions, protecting personal data, recognising cyber threats, and promoting positive digital interactions. Digital citizens are aware of their online footprints and strive to create a safe and constructive digital environment for themselves and others. Effective communication involves using digital tools such as email, social media, and virtual meeting platforms to share information and engage in discussions. Strong communication skills allow students to engage in meaningful discussions, express ideas clearly, and collaborate efficiently in virtual settings, which is increasingly essential in remote work and online learning environments. Nyemezu (2022) collaborated that for undergraduates to be effective in learning science, there is need for them to have acquired sound digital literacy skills.

Despite its importance, learning science faces several challenges, these includes; understanding of complex

topics, heavy content load, difficulty in applying gained knowledge, lack of personalized learning, and examination preparation. Additionally, undergraduates may struggle with abstract concepts, unfamiliar terminology, and a lack of hands-on experience. Teachers also face challenges in creating engaging lessons, managing classrooms, and utilizing effective teaching methods. However, due to the significant benefits of learning science towards technology development, government and stakeholders in the sector have made many attempts towards smooth teaching and learning of the discipline. Despite these interventions, undergraduates still face some issues in learning science. Hence, this study examined undergraduates' digital literacy skills as factors fostering learning science in Ogun state, Nigeria.

Research Objectives

The main objective of the study was to examined undergraduates' digital literacy skills as factors fostering learning science in Ogun state, Nigeria. Specifically, the study sought to examine the:

1. level of undergraduates' digital literacy skills for learning science in Ogun state;
2. issues confronting the effective learning science among undergraduates in Ogun state;
3. influence of digital literacy skills on undergraduates' learning science in Ogun state;
4. relationship between digital literacy skills and undergraduates' learning science in Ogun state.

Research Questions

The following research questions were answered in this study.

1. What is the level of undergraduates' digital literacy skills for learning science in Ogun state?
2. What are the issues confronting the effective learning science among undergraduates in Ogun state?

Hypotheses

The following null hypotheses were tested at 0.05 significance level.

$H0_1$: There is no significant influence of digital literacy skills on undergraduates' learning science in Ogun state.

$H0_2$: There is no significant relationship between digital literacy skills and undergraduates' learning science in Ogun state.

Review of Literature

Okpa (2025) evaluates digital literacy skills among students in tertiary institutions in the southern geopolitical zone of Nigeria. The findings indicate that major emerging trends in digital literacy skill requirements among tertiary institution students include improved information retrieval, Artificial Intelligence (AI) and machine learning, data science and analytics, and cybersecurity. The study also revealed that these digital literacy skills significantly impact students' learning outcomes by enhancing information retrieval, expanding access to educational research, increasing collaboration and communication, and facilitating feedback and assessment. Additionally, inquiry-based learning, multimedia presentations, and flipped classroom approaches were identified as the most effective methods for integrating digital literacy skills in tertiary institutions. Debbarma and Shivam (2025) explored the Influence of digital literacy on science achievement among secondary school

students. The study findings reflect the impact of digital literacy on science achievement among secondary students, and it has particular importance these days as a tool in educational fields. Iftanti et al. (2025) examined the digital literacy development and factors affecting students' digital skills in the Language and Science Departments of a state Islamic university in Tulungagung, Indonesia. The results of this study demonstrated that good digital literacy skills are developed from internal factors like strong curiosity towards digital technology, individual desires, and educational needs for digital, students' preference for digitalization, and keeping up to date through using digital technology. Aremu and Udofia (2025) investigated the digital literacy skills of undergraduate Students Performing via Online Tests in Lagos State, Nigeria. Findings show that digital literacy plays a significant and positive role in the outcome of undergraduate performance. Ekine et al. (2024) examined digital literacy and learning as tools to quality education in Nigerian secondary schools in the post-Covid-19 era, with a specific focus on Rivers State. The findings revealed that there is confidence level of students in using digital tools, there is limited access to reliable internet connectivity, sufficient availability of digital devices. On the role of teacher training and support in facilitating digital literacy and learning, there is disagreement. That is there is insufficient training opportunities for teachers to develop their digital literacy skills, among others. Tamunoiyala and Williams (2022) investigated the Perceived Digital Information Literacy Level of Undergraduates at the University of Port Harcourt. The findings of the study revealed that undergraduate students are digitally knowledgeable. Finally, there is significant difference between undergraduate students' digital information literacy level among the various departments. Ibrahim (2024) assessed the knowledge and perception of lecturers regarding the integration of artificial intelligence for research and teaching in the faculty of arts in Nigeria. The findings revealed that the challenges militating against the use of artificial intelligence by lecturers include technical barriers, limited resources, and the need for AI systems to understand context and nuance, particularly in fields like literary translation, which complicates effective integration into teaching and research. Abdelaal and Sawy (2024) findings revealed that the drawbacks militating against the deployment of artificial intelligence include difficulties in understanding artificial intelligence algorithmic outcomes, the complex autonomy of AI systems, financial implications of implementation, and concerns regarding data privacy, alongside apprehensions about AI's impact on teaching and professors' roles.

Methodology

The descriptive survey research design was adopted for the study. The design was appropriate because it assisted the researchers to establish and collect needed data from the target audience towards answering and testing of research questions and hypotheses of the study. The population of this study comprised undergraduates of the Department of Educational Technology in Tai Solarin University of Education (TASUED), Ijagun. 80 undergraduates of the Department of Educational Technology in Tai Solarin University of Education (TASUED) were selected as sample size of the study. Stratified sampling technique was adopted to select sample size in order to ensure gender-balance. A self-researcher-designed instrument tagged Undergraduates' Digital Literacy Skills and Learning Science Questionnaire

(DLSLSQ) was used for this study. DLSLSQ was used for the collection of data from respondents on the level of undergraduates' digital literacy skills for learning science; issues confronting the effective learning science among undergraduates; and items on learning science. The questionnaire was structured on a four (4) – point Likert response scale format which is a modification of 5-point Likert scale. To ensure the face and content validity of the instrument, copies of the instrument were given to experts in the Department of Educational Technology, Tai Solarin University of Education (TASUED). Reliability test of the instrument (DLSLSQ) was done using a test-retest method. In this case, copies of the instrument (DLSLSQ) were administered twice on 10 undergraduates of the Department of Educational Technology, University of Ilorin, that are not part of the sample size within a week interval. The collected data from the dual administration of the instruments were compared using Pearson Product Moment Correlation (PPMC). It was reported that reliability coefficient yielded 0.92. Primary method of data collection was adopted in this study. Primary method includes the usage of questionnaire to collect data from the identified respondents. Descriptive statistics of mean and standard deviation were used for answering research questions 1 and 2. Hypotheses were tested using inferential statistics of regression analysis and correlation (PPMC).

Results and Discussion

Research Question 1: What is the level of undergraduates' digital literacy skills for learning science in Ogun state?

Table 1: Mean and standard deviation responses on the level of undergraduates' digital literacy skills for learning science in Ogun state

Items	Mean	SD
Information and data literacy skills	2.87	1.333
Communication skills	2.64	1.004
Collaboration skills	3.13	1.173
Content creation skills	2.93	1.003
Safety and problem-solving skills	3.15	.947
Skills to navigate and utilize various technologies.	3.22	.903
Cluster Mean	2.99	

Source: Field Survey, 2025

Table 1 indicated that cluster mean was 2.99 and the bench mark mean value was 2.50. This implied that the level of undergraduates' digital literacy skills for learning science in Ogun state was moderate.

Research Question 2: What are the issues confronting the effective learning science among undergraduates in Ogun state?

Table 2: Mean and standard deviation responses on the issues confronting the effective learning science among undergraduates in Ogun state

Items	Mean	SD
Difficulty with abstract concepts	2.89	.911
A heavy content load	2.92	.745
Inadequate digital skills by the teachers and students	3.00	.999

Poor practical applications	3.18	.934
Low level of digital infrastructure.	3.26	.833
Inadequate resources	3.29	.826
Lack of qualified teachers	3.33	.799
Cluster Mean	3.12	

Source: Field Survey, 2025

Table 2 showed that cluster mean was 3.12 and the bench mark mean was 2.50. Since, 3.12 >2.50, this implied that difficulty with abstract concepts, a heavy content load, inadequate digital skills by the teachers and students, poor practical applications, low level of digital infrastructure, inadequate resources, and lack of qualified teachers were among the issues confronting the effective learning science among undergraduates in Ogun state.

$H0_1$: There is no significant influence of digital literacy skills on undergraduates' learning science in Ogun state.

Table 3: Influence of digital literacy skills on undergraduates' learning science in Ogun state

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.979	1.381		13.020	.000
	Digital literacy skills	.163	.048	.161	3.356	.001

Dependent variable: Undergraduates' learning science

The first important thing to note in Table 3 was that the sign of the coefficient of digital literacy skills is positive. This implied that there was positive influence of digital literacy skills on undergraduates' learning science. Furthermore, the probability (p = 0.01) as reported in Table 4.5 for digital literacy skills implied that the slope (**β** = (0.16) is statistically significant. Hence, the researchers concluded that null hypothesis 1 was rejected and that there was a significant influence of digital literacy skills on undergraduates' learning science in Ogun state.

$H0_2$: There is no significant relationship between digital literacy skills and undergraduates' learning science in Ogun state.

Table 4: Relationship between digital literacy skills and undergraduates' learning science in Ogun state

Variables	Mean	SD	df	r-value	p-value
Undergraduates' learning science	15.8800	2.21692			
Digital literacy skills	16.1100	2.25583	78	.429	.003

Source: Field Survey, 2025

It was observed from Table 4 that there was significant relationship between the independent variable and the dependent variable (r = 0.43, p <.05). On this premise, the null hypothesis 2 was hereby rejected and the researcher concluded that there was a significant relationship between digital literacy skills and undergraduates' learning science in Ogun state.

The findings of the study showed that there was a moderate level of undergraduates' digital literacy skills for learning science in Ogun state. These findings were in agreement with Okpa (2025) indicated that there was low level of digital literacy skills among undergraduates and that major emerging trends in digital literacy skill requirements among tertiary institution students include improved information retrieval, Artificial Intelligence (AI) and machine learning, data science and analytics, and cybersecurity. The study also revealed that these digital literacy skills significantly impact students' learning outcomes by enhancing information retrieval, expanding access to educational research, increasing collaboration and communication, and facilitating feedback and assessment. Additionally, inquiry-based learning, multimedia presentations, and flipped classroom approaches were identified as the most effective methods for integrating digital literacy skills in tertiary institutions. Ogochukwu et al. (2024) indicated that while lecturers' digital literacy concerning AI is slightly above moderate, their actual use of AI tools remains low. Common applications include research and writing, plagiarism detection, data analysis, presentations, content creation, and idea generation. Key barriers comprise inadequate internet services, limited management support, difficulties integrating AI into traditional pedagogy, time constraints, and high software costs.

The findings further indicated that difficulty with abstract concepts, a heavy content load, inadequate digital skills by the teachers and students, poor practical applications, low level of digital infrastructure, inadequate resources, and lack of qualified teachers were among the issues confronting the effective learning science among undergraduates in Ogun state. These findings were in consonant with Okpa (2025) findings who also highlighted significant challenges, such as the digital divide, the complexity of digital tools, and limited access to technology.

There was a significant influence of digital literacy skills on undergraduates' learning science in Ogun state. These findings corroborated with Debbarma and Shivam (2025) findings reflect the impact of digital literacy on science achievement among secondary students, and it has particular importance these days as a tool in educational fields. The study highlights the importance of use and incorporation for science learning, performing, and assessing. Iftanti et al. (2025) results of this study demonstrated that good digital literacy skills are developed from internal factors like strong curiosity towards digital technology, individual desires, and educational needs for digital, students' preference for digitalization, and keeping up to date through using digital technology. External factors like the student's environment and lifestyle also contributed to good digital literacy development. This can be pedagogically implemented in teaching language and sciences such as building college OLABS, digital college system, digital-based learning, and digital-based competitions. These proposed instructional programs need further investigation to assess their effectiveness. Ekine, Olefolun and Achinwenwaru (2024) findings revealed that there is confidence level of students in using digital tools, there is limited access to reliable internet connectivity, sufficient availability of digital devices. On the role of teacher training and support in facilitating digital literacy and learning, there is disagreement. That is there is insufficient training opportunities for teachers to develop their digital literacy skills, among others.

There was a significant relationship between digital literacy skills and undergraduates' learning science in Ogun state ($r = 0.429$, $p < .05$). These findings corroborated the findings of Aremu and Udofia (2025) that digital literacy plays a significant and positive role in the outcome of undergraduate performance. The study concludes that the technology is less expensive, has less manpower demand, has lower anxiety levels, is stress-free in marking and scoring, and develops undergraduates' psychomotor and cognitive skills. Tamunoiyala and Williams (2022) revealed that undergraduate students are digitally knowledgeable. Finally, there is significant difference between undergraduate students' digital information literacy level among the various departments. The study concluded that there is universal recognition of the need to be digital information literate especially for undergraduate students who virtually would use digital gadgets and Web 2.0 packages in the course of their academic pursuit. Ibrahim (2024) assessed the knowledge and perception of lecturers regarding the integration of artificial intelligence for research and teaching in the faculty of arts in Nigeria. The findings revealed that the challenges militating against the use of artificial intelligence by lecturers include technical barriers, limited resources, and the need for AI systems to understand context and nuance, particularly in fields like literary translation, which complicates effective integration into teaching and research.

Conclusion

This study examined undergraduates' digital literacy skills as factors fostering learning science in Ogun state, Nigeria, the following conclusions were drawn based on the findings of the study that:

1. There was moderate level of undergraduates' digital literacy skills for learning science in Ogun state.
2. Difficulty with abstract concepts, a heavy content load, inadequate digital skills by the teachers and students, poor practical applications, low level of digital infrastructure, inadequate resources, and lack of qualified teachers were among the issues confronting the effective learning science among undergraduates in Ogun state.
3. There was a significant influence of digital literacy skills on undergraduates' learning science in Ogun state.
4. There was a significant relationship between digital literacy skills and undergraduates' learning science in Ogun state.

Recommendations

The following recommendations were raise in line with the findings of the study:

1. University management should provide enhanced digital tools, adequate access to technology, and effective digital literacy training for undergraduates.
2. There should be an effective mechanism to overcome the challenges associated with teaching and learning science among undergraduates in university.
3. Lecturer and students should deepen the use digital literacy skills for easier understanding and interpretation of learning science.
4. Nigerian public universities should ensure capacity building for lecturer to improve their knowledge and skills on ways to

impact digital literacy skills on undergraduates.

5. Students should engage in and explore more academic activities using digital technology.
6. Digital literacy initiatives, should be strengthening by enhancing instructional strategies, improving infrastructure and access, providing comprehensive teacher training, and fostering collaboration among teachers.

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