

AWARENESS AND UTILISATION OF DIGITAL LITERACY AS PERCEIVED BY SCIENCE STUDENTS IN ABUJA MUNICIPAL AREA COUNCIL

¹Jacob Akintadese OJEBIYI & ²Marcellinus Chibueze ANAEKWE

¹*ojebiyijacob@gmail.com, 07033191450*

²*Department of Science Education*

National Open University of Nigeria. Abuja

manaekwe@noun.edu.ng, 08034409294

Abstract

Digital literacy refers to the capability of an individual to find, evaluate, utilize, disperse, and create information using digital technology and internet. This study was guided by two research questions and a hypothesis. The study adopted a descriptive- survey research design. The total of 198 students served as sample for the study. Digital Literacy Questionnaire for Science Students (DLQSS) developed by the researchers and validated by research expert at the National Open University of Nigeria. This was modelled along four-point Likert scale with a cut-off point of 2.50 and a reliability index of 0.78. Mean and standard deviation were employed to answer research questions, while ANOVA was used to test the hypothesis at 0.05 alpha level. The study revealed that students are largely aware (mean=3.36) of the concept of digital literacy, largely utilise digital literacy skills across classes as with mean values as SS1 students (mean=3.41), followed by SS2 (mean=3.14) and lastly SS3 (mean=3.13). There is no significant difference between the mean value of the classes on the extent of utilization of the digital literacy skills by science students ($F\text{-cal.} = 1.67$ is less than $F\text{-crit.} = 2.99$, for 2 and 196 degree of freedom at 0.05 alpha level). Based on the findings, it was recommended among others that: all education stakeholders should collaborate in engendering digital literacy awareness by providing relevant digital infrastructure in schools; irrespective of class levels, science students should be encouraged to utilize personal digital devices such as smartphone, laptop computer, tablet e.t.c.for learning purposes.

Key Words: Digital literacy, Awareness, Utilization, Teaching and Learning, Science students.

Introduction

Digital literacy refers to the capability of an individual to find, evaluate, utilize, disperse, and create information using digital technology and internet. According to Oncul (2021), digital literacy referred to the ability to understand information and more importantly to analyse and integrate information in various formats that the computer can deliver. Digital literacy encompasses the basic or fundamental digital skills and competences including ability of a teacher and learner to use Information Communication Technology (ICT) to solve various problems (David-West, 2022). Invention of devices such as computer, mobile phones, teacher's assisted applications e.g Artificial Intelligence (AI), digital charts and graphs e.t.c. All these applications were developed towards making learning of different concept personal, easier and convenient. This is a sign that the world has gradually shifted from traditional ways of teaching and learning to digital way, approach best for the 21st century demand for learning.

The concept of digital literacy aims to enlighten both teachers and students about its numerous benefits when applied appropriately. These include enhancing various online learning activities for positive results from internet use, and for entire process of accessing information inequality (David-west, 2022). Also converting complex information or idea to a simple and easy to learn form because of the current and up to date nature of the fact. It reduces teacher's stress and provides the learners with what is needed at a very cheaper rate.

Awareness of digital literacy refers to understanding the importance of possessing skills and knowledge necessary to effectively navigate, evaluate, and use digital technologies and information (Bekker, Douma, Poel, and Scheltenaar, 2015). It involves recognizing the significance of being able to critically assess online content, protect personal information, and participate responsibly in digital communities. The level of awareness can significantly influence digital literacy among science students by shaping the understanding of technology's importance, their motivation to learn digital skills, and their ability to utilize digital tools effectively in their studies and future careers (Shivaleela, Hiremath and Bankapur, 2019). Higher awareness often leads to greater interest and learning opportunities which consequently enhances effective utilisation of digital tools. Additionally, awareness can influence students' critical thinking about digital content helping them discern reliable information from misinformation or biased sources.

The influence of class level on digital literacy among science students can vary. Generally, as students advance to higher class levels, they may be exposed to more complex digital tools and tasks, which can contribute to the development of their digital literacy skills. For example, senior science courses may require students to conduct more advance research using online databases, analyse data using specialized software, or collaborate on digital platform (Baterna, Mina, and Rogayan, 2020). Additionally, teachers at higher class levels may expect students to demonstrate proficiency in using technology for academic purposes. This is supported by constructivism theory which empower learners to take control of their learning with little teacher facilitation in the presence of digital devices such as computer, iPhone etc to solidify learning. The use of digital literacy approach is more correlated to science-based subjects which form the ground to which science students were adopted for the study. However, the specific influence can vary depending on factors such as the curriculum, teaching methods, and access to technology resources.

Statement of the Problem

It is a fact that teachers are one of the first to expose the students to digital literacy. Therefore, teachers need to be digitally literate to the minimum level so as to navigate through the online platforms for effective teaching. This will enable them to meet up with 21st century teaching demand. During COVID-19 pandemic, majority of private and some public schools engage their students using virtual learning in other to comply with social distancing and to break large crowd of students as stipulated by COVID-19 rules. During this era, not all teachers are able to use these platforms of online teaching and also not all students are aware that teaching and learning can be done outside classroom setting as a result of inadequate digital literacy level of their teachers. It is not surprising that so many of the teachers in FCT up till now still adopt traditional method of teaching because of their inability to navigate or operate online facilities and devices. This fact limits the level of awareness of students about digital approach of learning which is the best for them as 21st century learners. It is against this fact that this

study is establish to assess the level of awareness, impact and challenges of digital literacy as perceived by the science students.

Purpose of the Study

This study sought to explore the level of awareness of digital literacy as perceived by science students in Abuja Municipal Area Council. Specifically, the objectives are to:

- i. determine the extent to which science students are aware of the concept of digital literacy.
- ii. determine the extent of utilization of digital literacy skills by science students across different class levels.

Research Questions

- i. What is the level of awareness of digital literacy skills as perceived by science students in AMAC?
- ii. To what extent is the utilization of digital literacy skills among science students influenced by class level?

Hypothesis

There is no significant difference between the mean ratings on utilization of digital literacy skills relative to students' class level.

Methodology

The study adopted a descriptive- survey research design. The population consisted of all the students in the public senior secondary schools as well as private senior secondary schools in Abuja Municipal Area Council (AMAC). Stratified random sampling technique was used to select four (4) Government Senior Secondary schools and six (6) private senior secondary schools respectively making the total of ten (10) senior secondary schools across the local council. Twenty (20) students were sampled in each of the selected schools across the three-class level for comprehensive data collection making a sample size of 240, however only 198 of them filled and returned their completed questionnaires. The major instrument for data collection was the Digital Literacy Questionnaire for Science Students (DLQSS) developed by the researchers. The response format follows the 4-point Likert scale of Strongly Agreed (SA, 4points), Agreed (A, 3 points), Disagreed (D, 2 points) and Strongly Disagreed (SD, 1 point). A cut-off points of 2.50 was adopted for decision taking. For data analysis, frequency counts, means and standard deviations were employed to answer research questions, while t-test and ANOVA were used to test hypothesis at 0.05 level of significance.

Results: Results of the study were presented according to the research questions and hypotheses.

Table 1. Means and standard deviations in respect of level of awareness of digital literacy skills.

S/N	Digital Literacy Awareness	S/A	A	D	S/D	N	X	S.D	REMARK
1	I am aware of digital/online/virtual literacy	102	96	-	-	198	3.52	9.60	Accepted
2	I am knowledgeable enough on the importance of digital literacy	100	82	12	4	198	3.40	8.87	Accepted
3	Awareness of digital literacy enables me to improve my academic performance as a science student.	90	100	6	2	198	3.40	9.22	Accepted
4	Digital literacy is commonly gained through use of handsets.	122	68	5	3	198	3.56	9.58	Accepted
5	Digital literacy awareness should be made part of school program.	88	110	-	-	198	3.48	9.66	Accepted
6	Social media plays useful role in digital literacy training.	106	74	12	6	198	3.45	8.87	Accepted
7	Social media provide abundant information about digital literacy to me as a science student.	104	80	4	10	198	3.40	9.00	Accepted
8	Peer group enables awareness on digital literacy than anyone else around me	56	57	50	38	198	2.67	6.73	Accepted
CLUSTER MEAN							3.36	8.94	Accepted

Table 1 shows the view of the respondents on the level of awareness of digital literacy as perceived by science students in AMAC, FCT. Items 1 to 8 were accepted as the value of the item mean ratings were above the cut-off point of 2.50. Item 8 of the instrument which demands the influence of peer group on the level of awareness of the respondents on digital literacy has the lowest mean value of 2.67 while item 4 has the highest mean value of 3.56. The cluster average of the mean and standard deviation was 3.36 and 8.90 respectively. This means that science students in AMAC, FCT are largely aware (mean = 3.36) of the benefit of digital literacy.

Table 2. Means and standard deviations for the utilisation of digital literacy skills relative to Class levels (SS1 N= 43, SS2 N=60, & SS3 N=91)

S/N	Digital Literacy Awareness	N	X	ST. D	N	X	ST. D	N	X	ST.D
1.	I am aware of digital/online/virtual literacy	43	3.45	4.17	60	3.33	5.2	91	3.69	6.61
2	I am knowledgeable enough on the importance of digital literacy	43	3.43	3.22	60	3.28	4.38	91	3.47	5.93

3	Awareness of digital literacy enables me to improve my academic performance as a science student.	43	3.40	2.95	60	3.45	4.61	91	3.42	6.34
4	Digital literacy is commonly gained through use of handsets.	43	3.49	4.04	60	3.50	4.69	91	3.64	6.48
5	Digital literacy awareness should be made part of school program.	43	3.64	4.31	60	3.48	4.85	91	3.35	6.71
6	Social media plays useful role in digital literacy training.	43	3.38	3.73	60	3.43	4.50	91	3.42	5.82
7	Social media provide abundant information about digital literacy to me as a science student.	43	3.40	3.82	60	3.43	4.61	91	3.38	5.88
8	Peer group enables awareness on digital literacy than anyone else around me	43	2.89	3.03	60	2.77	3.29	91	2.46	4.32
Impact of digital literacy on your academic performance										
9	Digital literacy approach is the best for effective learning for you as a science student.	43	2.98	3.94	60	2.90	4.02	91	2.97	4.87
10	Large volume of content were learnt at a shortest possible time through digital literacy approach.	43	3.40	3.88	60	3.47	4.67	91	3.46	5.87
11	There is a better academic improvement whenever you are taught using digital literacy approach.	43	3.59	4.16	60	3.63	5.21	91	3.48	5.96
12	Digital literacy approach make communication between teachers and	43	3.49	3.98	60	3.57	4.94	91	3.41	5.81

	students effective. more											
13	Digital literacy approach reduces teaching-learning stress and drudgery	43	3.19	3.83	60	3.15	4.32	91	3.35	5.68		
14	Digital literacy enhances communication and collaborative skills among science students.	43	3.64	4.56	60	3.48	4.91	91	3.51	6.07		
15	Application of digital literacy tools grant science students more access to learning resources.	43	4.00	4.74	60	3.62	5.00	91	3.64	6.84		
16	Some digital literacy tools often make science students lazy and unserious with their studies.	43	3.02	3.02	60	2.52	3.48	91	2.38	4.69		
Challenges science students faced in using digital literacy models/tools												
17	My school computer laboratory is adequately equipped with digital facilities for learning purposes	43	2.49	3.03	60	2.83	3.24	91	2.32	4.40		
18	Science teachers have adequate digital literacy skills to drive learning effectively.	43	2.60	2.88	60	2.50	3.34	91	2.48	4.67		
19	My school strongly support science students using digital devices such as smart phone, laptop computer during teaching –learning period.	43	2.30	3.33	60	2.20	3.77	91	2.08	4.83		
20	My parents do allow me to use digital devices such as smart phone, laptop computer or other	43	3.74	3.93	60	3.48	4.61	91	3.21	5.18		

	internet enabling devices for my studies										
21	The societal view about the use of digital devices among students affect their exposure to digital literacy skills.	43	3.58	3.92	60	3.38	4.61	91	4.90	4.73	
22	The religion believes about the use of digital devices among students affect their exposure to digital literacy skills	43	2.53	3.23	60	2.37	3.73	91	2.40	4.64	
23	My parents cannot avoid purchasing essential digital devices for me.	43	2.70	3.79	60	2.63	4.10	91	2.35	5.30	
24	Negative influence from peers e.g betting sites, lead to misuse opportunities from digital devices by the students.	43	3.33	4.07	60	3.02	4.34	91	2.81	5.21	
25	Poor supervision by parents and teachers lead to misuse of digital devices by the students	43	3.42	3.66	60	3.07	4.08	91	2.67	4.61	
Cluster Mean			3.41	3.89		3.14	4.34		3.13	5.50	

Table 2 shows the mean and standard deviations on the utilisation of digital literacy skills relative to class levels. For SS1 (N = 43), out of the 25 items of the research instrument, 23 were accepted since their mean values were up to or above the cut-off points of 2.50. Items 17 and 19 were rejected as their mean values were below the 2.50. Item 20 of the instrument has the highest mean value (3.74) while item 19 has the lowest mean value (2.30). The cluster average of the mean and standard deviation were 3.41 and 3.89 respectively.

For the Senior Secondary School Two (SS2) column, out of the 25 items on the instrument, 23 were accepted since their mean values were equal to, or above the cut-off point of 2.50. Items 19 and 22 were rejected because their calculated mean values were below 2.50. Item 11 of the instrument has the highest mean value (3.63) while item 19 has the lowest mean value (2.20). The cluster average mean and standard deviation were 3.14 and 4.34 respectively.

For the Senior Secondary School Three (SS3) column, out of the 25 items on the instrument, 18 were accepted as their mean values were equal to or above the cut-off points of 2.50, while 7 were rejected. Item 21 of the instrument has the highest mean value (4.90) while item 19 has the lowest mean value (2.08).

Therefore, comparing the cluster mean values of the three classes: SS1 = 3.41, SS2 = 3.14 and SS3 = 3.13, it shows that SS1 had the highest mean value, followed by SS2 and lastly, SS3. This means that the utilization of digital literacy was mostly perceived by SS1 students (mean=3.41), followed by SS2 students(mean=3.14) and lastly by students (mean=3.13).

Hypothesis Testing

There is no significant difference between the mean values of the classes on the extent of utilization of digital literacy skills by science students

Table 3: F-ratio of Difference between the mean Class Level and utilization of digital literacy approach by science students in AMAC, FCT

Source of Variation	Sum squares	Df	VE	F-cal	F-crit	Remark
Between	0.49	2	0.25			Accept
Within	29.15	196	0.15	1.67	2.99	Null
Total	29.64	198	0.40			hypothesis

Table 3 summarizes the opinion of the respondents in the direction of the hypothesis as stated above. Since the calculated f-value (1.67) is less than the critical f-value (2.99) for 2 and 196 degree of freedom at 0.05 alpha level, null hypothesis is therefore accepted as stated. This implies that there is no significant difference between the mean values of the classes on the utilization of digital literacy approach by science students in AMAC, FCT.

Discussion of Findings

Awareness of the benefits of Digital Literacy by Science Students in AMAC: The first findings of the study stated - Science students in AMAC are largely aware (mean=3.36) of the benefit of digital literacy. Of the 8 items pose by the research instrument on the level of awareness of digital literacy as perceived by science students in AMAC, all the items were accepted as a result of the cluster mean value (3.36) above cut-off points of 2.50. This implies that science students in AMAC, FCT are largely aware (mean = 3.36) of the benefit of digital literacy. This corroborate the study of David-West (2022) who in her study posited that digital literacy awareness among secondary school students contributes immensely to academic attainment especially 21th century demand. This finding can be justified as a result of high exposure of students to digital gadgets and devices such smartphone, laptop computer, tablet etc. AMAC community at large is highly exposed to computer literacy decades ago, this largely facilitate and hence students' level of awareness of digital literacy.

Utilization of Digital Literacy Skills as Perceived by SS1, SS2 and SS3 Science Students: The influence of various class level on the utilization of digital literacy was as well examined. According to this study, utilization of digital literacy was most positively perceived by SS1 students (mean=3.41), followed by SS2 students (mean=3.14) and lastly by SS3 students (mean=3.13). Examining the study hypothesis which state that there is no significant difference between the mean values of the classes on the utilization of digital literacy approach by science students in AMAC, FCT. The null hypothesis was accepted as a result of F-cal. (1.67) less than the F-crit. (2.99) for 2 and 196 degree of freedom at 0.05 alpha level. This implies that no

significant difference between the mean value of the classes on the utilization of digital literacy approach by science students in AMAC, FCT. This finding clearly revealed that all the three class levels are proficient in the utilization of digital literacy skills as their calculated mean value as stated above exceeded the cut-off points of 2.50. This finding slightly contradicts the study by Chigbundu & Oluwabiyi (2023), which stated that high class level is possibly going to perform better digitally than the lower classes as a result of digitally prone task they are exposed to. This finding can however, be justified as a result of the level of awareness of benefits and impacts of digital literacy on teaching – learning process among science students generally. It could as well be that the SS1 classes were being handled by a more digitally-exposed teacher compared to the higher classes who were more pre-occupied with preparation for external examinations.

Examining the study hypothesis which state that there is no significant difference between the mean values of the classes on the utilization of digital literacy approach by science students in AMAC, FCT. The null hypothesis was accepted as a result of F-cal. (1.67) is less than the F-crit. (2.99) for 2 and 196 degree of freedom at 0.05 alpha level. This implies that there was no significant difference between the mean values of the classes on the utilization of digital literacy approach by science students in AMAC, FCT.

Recommendations

1. All education stakeholders should collaborate in engendering digital literacy awareness by providing relevant digital infrastructure in schools.
2. Irrespective of class levels, science students should be encouraged to utilize personal digital devices such as smartphone, laptop computer, tablet e.t.c.for learning purposes.
3. Non-Governmental Organizations (NGOs), Professional Associations like STAN, MAN, etc., and other stakeholders should support government's effort to mainstream adoption of digital literacy for teaching and learning purposes.

References

- Baterna, H., Mina, T. D., & Rogayan, D. M., Jr. (2020). Digital literacy of STEM senior high school students: Basis for enhancement program. *International Journal of Technology in Education*, 3(2), 105–117. <https://dx.doi.org/10.2139/ssrn.3736606>
- Bekker, T. B., Douma, S., Poel, I. J., & Scheltenaar, K. (2015). Teaching children digital literacy through design-based learning with digital toolkits in schools. *International Journal of Child-Computer Interaction*, 5, 29–38. <https://doi.org/10.1016/j.ijcci.2015.12.001>
- Chigbundu, M. C., & Oluwabiyi, M. O. (2023). Digital literacy, perception and challenges of e-learning among undergraduates in public universities of Nigeria. *International Journal of Scientific Research in Multidisciplinary Studies*, 9, 107–115.
- David-West, B. T. (2022). Digital literacy skills and utilization of online platforms for teaching by LIS educators in universities in River State. *International Journal of Knowledge Content Development & Technology*, 12(4), 105–117. <https://dx.doi.org/10.5865/IJKCT.2022.12.4.105>
- Oncul, G. (2021). Defining the need: Digital literacy skills for first-year university students. *Journal of Applied Research in Higher Education*, 13(4), 925–943. <https://doi.org/10.1108/JARHE-06-2020-0179>

Shivaleela, S. H., & Bankapur, V. M. (2019). Awareness and proficiency in digital literacy skills among librarians of first grade degree colleges of Bagalkot District with respect to age group. *International Journal of Librarianship and Administration*, 10(1), 11–18.