ASSESSMENT OF DIGITAL LITERACY SKILLS AMONG SCIENCE STUDENTS IN SECONDARY SCHOOLS IN BAYELSA STATE

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Abstract

This study assessed digital literacy skills among secondary school students in Bayelsa State, Nigeria. A descriptive survey design was adopted for the study. Two research questions and corresponding null hypotheses were formulated to guide the study. The population of the study consist of all science students in the 192-government owned secondary schools in Bayelsa state. 499 science students comprising of 240 males and 249 females formed the sample of the study. The instrument for data collection was a structured researcher developed "Digital Literacy Skill Questionnaire (DLSQ)" which was validated by experts. The reliability of the instrument was established using Cronbach Alpha formula and a coefficient of 0.84 was obtained. The research questions were answered using mean and standard deviation, while the hypotheses were tested using t-test statistics. The results revealed that the extent to which digital literacy skills are utilized among secondary school science students in Bayelsa State was low. It was recommended that the school management should ensure that students are encouraged to acquire digital skills.

Keywords: *Assessment, Digital, Literacy, Skills, Students*

Introduction

In today's globalized world and knowledge –driven economy, any society wishing to develop must put in place a proper and well-planned educational system that will help drive technological advancement and transformation of society. This is because education has proven itself to be a potent kit for growth, development, progress and prosperity to individuals and nations alike. National Policy on Education, was quick to note this fact when it declared that education is an instrument "par-excellence" for effective national development (NPE, 2014). Also, Korikiye (2017) noted that countries that respond astutely in proving functional education would experience progress, while others who do not respond will face the risk of being stagnated and even slip backward. Human capital when adequately developed and sufficiently owned, remains the fundamental basis for wealth accumulation by any nation.

Despite the importance of education in real life situations, research reports from Charles-Owaba (2021) and Omeodu and Charles-Owaba, (2021) submitted that lack of digital skills among graduates is a significant reason for unemployment in Nigeria. Charles-Owaba (2021) defined digital literacy skills as the ability to effectively use technology to find, evaluate, create and communicate information. These skills are essential in today's digital age, as technology plays a critical role in almost every aspect of our lives. Omeodu and Charles-Owaba (2022) identified some of the key digital literacy skills as:

i. Internet literacy: The ability to navigate the web and effectively use search engines to find information.
ii. Media literacy: The ability to evaluate the credibility and reliability of digital media sources.

iii. Information literacy: The ability to critically evaluate and analyze information for accuracy, bias, and relevance.
iv. Communication skills: The ability to effectively communicate using digital tools such as email, instant messaging and social media.
v. Cybersecurity: The ability to protect personal information and devices from online threats.
vi. Digital citizenship: The ability to understand and follow ethical and legal guidelines when using technology.

Developing these digital literacy skills is crucial for success in today's digital world, both personally and professionally. The Nigerian government recognizes the importance of Digital Economy as a tool for development of the country. It has stressed that the need for inclusion of the components of digital economy in all facets of the nation. As a way to match actions with words, the policy was enacted on the 12th of June, 2019. As part of initiatives to implement its new policy thrust of expanding the frontiers of the digital economy ecosystem, the Federal Government re-designated the Federal Ministry of Communication as Ministry of Communication and Digital Economy on the 17th of October, 2019 to equip the ministry with the responsibility of coordinating the activities related to Nigeria's digital economy. The Nigerian Digital economy Policy and Strategy has been developed to reposition the Nigerian Economy in order to take advantage of the many opportunities that digital technologies provide.

The digital economic policy and strategy document is framed on the 8-pillars for acceleration of the National Digital Economy for a digital Nigeria, (NDEPS, 2020). The 8-pillars are;

i. Developmental regulation
ii. Digital literacy and skills
iii. Solid infrastructure
iv. Service infrastructure
v. Digital services development and promotion
vi. Software infrastructure
vii. Digital society and emerging technologies
viii. Indigenous content development and adoption

Karuitha (2020) forecasts that optimizing the use of digital skills and technologies could generate $2trillion of additional global economic output by 2030. However, Zabairu, et al. (2020) observed that one of the greatest barriers to the actualization of digital economy policy is the high rate of digital illiterates. National Digital Economy Policy and Strategy (NDEPS, 2020) identified digital literacy and skills as one of its cardinal pillars, hence, the policy document stated the following as its objectives:

i. To integrate digital literacy and skills into the national education curriculum at all levels;
ii. To support training and capacity building among public sector employees in the development and use of digital tools and applications to improve the delivery of government services;
iii. To create a pool of Nigerians with digital skills validated by globally recognized certifications;
iv. To bridge the gap between the academia and industry; and
v. To lower the access barrier to digital tools for the citizens;
vi. Integrate digital literacy and skills development into the curriculum of schools at all tiers of education

vii. Provide support for digital literacy and skills development for Nigerians across the country and in various sectors of the economy

viii. Leverage the existing network of schools, training institutes, Computer Based Testing (CBT) centres, community resource centres, amongst others, to facilitate digital skills training programmes across the country women, internally displaced persons and the physically challenged

ix. Promote the development and distribution of instructional materials in electronic format.

Also, NDEPS (2020) averred that to drive the digital economy it is important to develop a large pool of digitally literate and digitally skilled citizens. Nigeria Digital Economy Diagnostic Report (2018) submitted that

"*Low enrolment in basic education and poor quality of that education coupled with a lack of digital skills in curricula is segmenting digital skills into a slim share of the population, excluding the poorest from the benefits of the digital world*".

Nigeria Digital Economy Diagnostic Reports (2018) further submitted that there is need to support a programme for mass digital literacy. The above report on digital economy implies that, there is a need for a comprehensive assessment on digital literacy skills among science students. Gender, according to Offor (2010), refers the social relations between men and women, that although it could be directed by sex, which refers to the biological differences between them, it has nothing to do with physiological characters. To Ewhrudjakpor (2016), gender refers to culturally patterned behaviours either actual or normative which are attached to sexes. It involves masculinity or femininity. Many studies have shown that gender gap is a factor that affects achievement scores in sciences and mathematics. However, no known empirical work has established the influence of gender on digital literacy among science students in Nigeria. Hence, this study is aimed at assessing the digital literacy skills among students in secondary schools along gender lines.

Statement of the Problem

Despite this universally acknowledged role of science to mankind, its graduates are not exempted from the menace of unemployment currently ravaging the globe. The characteristics of the work-world and workforce qualification needed by industry in the era of knowledge-based economy today has been changing rapidly. One of the main characteristics of knowledge-based industry is the growing demand for generic skill attributes that must be owned by the workers (Gibb, 2021).

In addition to the requirement of technical skills in the field, workers must also have skills that are generic. This implies that the industry in the era of knowledge-based economy requires workers who are able to work independently, able to manage themselves, to work in teams, to adapt to change, to solve complex problems and to think in a creative and innovative way. In other to harness the benefits in the digital economy policy launched in Nigeria in 2019 and navigate freely in the knowledge-based economy, reports have shown that there is need for a massive improvement of digital literacy skills. There is a dearth of empirical research evidence on the availability and extent of utilization of digital literacy skills among science students in Nigeria, hence, this study is geared towards filling this gap.

Purpose of the Study

The study assessed digital literacy skills among secondary school students in Bayelsa State, Nigeria. Specifically, the study achieved the following objectives:

i. The extent to which Internet literacy skills are utilized among secondary school students in Bayelsa State.

ii. The extent to which digital communication skills are utilized among secondary school students in Bayelsa State.

Research Questions

The following research questions were raised to guide the study:

1. To what extent is Internet literacy skills utilized among secondary school students in Bayelsa State?
2. To what extent is digital communication skills utilized among secondary school students in Bayelsa State?

Hypotheses

The following null hypotheses were raised and tested at 0.05 level of significance:

H_{O1}: There is no significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which internet literacy skills is utilized in Bayelsa State.

$H0_2$: There is no significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which digital communication skills are utilized in Bayelsa State.

Methodology

Descriptive survey design was adopted in this study. Descriptive survey research design, according to Lawrant (2018), is the one in which a group of people or item is studied by collecting analysing data from only a few individuals or items considered to be representatives of the entire group. This design is appropriate for this study since information was gathered from a sample of the population (SS3 students and teachers), who are familiar with the ideas relating to the purpose of the study with the aim of generalizing the results for the entire population. The population comprised all the 30579 students in the 193 secondary schools in the 8 educational zones in Bayelsa State (Bayelsa Ministry of Education, 2023). A sample of 499 students comprising of 240 males and 259 females formed the sample of the study. Simple random sampling techniques by balloting was used to sample 3 schools each from the three senatorial districts in Bayelsa State, making it a total of 9 schools. SS3 students were purposively selected, because they are the oldest students in the system who can respond to the questionnaire. All the 499 SS3 students from the 9 schools formed the sample of the study.

The instrument used for data collection was "Digital Literacy Skill Questionnaire (DLSQ)" developed by the researchers. The items in the DLSQ are classified into 3 sub-sections namely, A, B and C. Section A measured the demographic information of the respondents, while section B and C measured the variables, level of internet Literacy and communication skills respectively. The section B and C were structured in a four-point rating scale which the respondents are required to respond to by indicating one option ranging from Very High Extent (VHE), High Extent (HE), Low Extent (LE) to Very Low Extent (LE) which is rated as 4, 3, 2 and 1 respectively. The face and content validity of the instrument was ascertained by giving it to specialist in measurement and evaluation and my supervisor. Their corrections advice and suggestions were considered in the final draft. Operationally, to test for

reliability of the instrument used, pilot study was carried out on 20 students randomly selected from two schools outside the area under study. Cronbach Alpha reliability formula was used to determine the reliability coefficient of the instrument. This was used to determine the internal consistency of the instrument. Also, the choice of Cronbach Alpha formula was based on the fact that the instrument was polychotomously scored (i.e no right or wrong answer) and the reliability method enabled the researcher to administer the instruments once, saving cost and time. The aggregate reliability coefficient for the instruments was reported as 0.84. One-on-one mode of instrument administration was adopted in the study. The researcher personally visited the sampled schools and administer the tools. The students were briefed on the modalities and the reasons behind the administration of the instrument. This method ensured 100% return rate. The research questions were answered using Mean and standard deviation while T-test statistics was used to test the hypotheses at 0.05 significance level. The decision rule for answering the research questions was arrived at by finding the average of the 4-point scale, thus; $\frac{4+3+2+1}{4} = \frac{10}{4} = 2.50$ thus, any item with mean of 2.50 and above was interpreted as high extent, while mean score below was interpreted as low extent. For the hypotheses, if calculated t-value is greater than the critical t-value, the null hypothesis was rejected. Otherwise, the null hypothesis was accepted.

Results

Research Question 1: To what extent is Internet literacy skills utilized among secondary school science students in Bayelsa State?

Table 4.1: Mean and Standard Deviation of Responses on Research Question 1

		Female N =259			Male N =240		
S/N	**ITEMS**	**X_1**	**$S.D_1$**	**REMARK**	**X_2**	**$S.D_2$**	**REMARK**
1	I can use digital devices such as laptops, smartphones, ipads, desktops when connected to Internet	1.71	0.84	L.E	1.23	0.62	L.E
2	I know the purpose of a search engine	2.41	1.15	L.E	2.36	1.15	L.E
3	I have the ability to engage in online communities	2.36	1.15	L.E	3.32	1.18	H.E
4	I love phishing"	3.19	0.74	H. E	2.41	1.10	L.E
5	I can find and evaluate online information	3.31	0.50	H. E	2.07	1.16	L.E
6	I possess critical thinking skills	3.32	0.58	HE	2.13	1.12	LE
	GRAND MEAN	2.72	0.83		2.09	1.04	

*LE= Low Extent, HE= High Extent Source: Fieldwork (**2023)**

Results presented in Table 1 above indicated that the extent to which Internet literacy skills utilized among secondary school science students Bayelsa State. The mean of item 1, 2 and 3 was lower than the criterion mean of 2.5 for both group of respondents, which implies low extent. Item 4, 5 and 6 had mean value greater than the criterion mean of 2.50 for the female students, which implies high extent of utilization. The grand mean of 2.72 and 2.09, indicated that the extent to which Internet literacy skills is utilized among secondary school science students is high for females and low for male students.

Research Question 2

To what extent is Communication technology skills utilized among secondary school science students in Bayelsa State?

Table 4.2: Mean and Standard Deviation on Responses on Research Question 2

	Female N =259	**Male N =240**					
S/N	**ITEMS**	**X_1**	**$S.D_1$**	**REMARK**	**X_2**	**$S.D_2$**	**REMARK**
7	I have clear and concise writing in communication	1.47	0.59	L.E	1.78	0.85	L.E
8	I can analyze facts objectively and communicate leave	1.49	0.66	L.E	2.35	1.15	L.E
9	I can engage in online communities	1.53	O.54	L.E	2.38	1.15	L.E
10	I network with other colleagues via computers	1.79	0.73	LE	3.19	0.74	HE
11	I can find and evaluate online information	1.64	0.76	LE	3.30	0.50	HE
12	I can adapt your communication style to different audiences	1.52	0.78	L.E	3.32	0.58	HE
	GRAND MEAN	1.57	0.68		2.71	0.83	

Source: Fieldwork (2023)

Results presented in Table 2 above indicated that the extent to which Communication technology skills utilized among secondary school science students in Bayelsa State. The mean of item 7, 8 and 9 was lower than the criterion mean of 2.5 for both group of respondents, which implies low extent. Item 10, 11 and 12 had mean value greater than the criterion mean of 2.50 for the male students, which implies high extent of utilization. The grand mean of 1.57 and 2.71, indicated that the extent to which Communication technology skills utilized among secondary school science students in Bayelsa State is high for males and low for female students.

Hypotheses

H_{O1}: There is no significant difference between the mean responses of male and female secondary school science students on the extent to which internet literacy skills is utilized in Bayelsa State.

Table 4.5: t-test analysis on the extent to which internet literacy skills is utilized in Bayelsa State

Category	N	Mean	St.D	Df	P	t	Sig. (2-tailed)	Decision
Female	259	2.720	.825	497	0.05	7.529	0.00	Accept Ho_1
Male	240	2.086	1.049					

Source: Fieldwork (2023)

From Table 3 above, the calculated t-value is 7.529 at 497 degree of freedom and 0.05 level of significance. Since the calculated t-value of 7.529 is greater than the critical table value of 1.96, the null hypothesis is rejected. In other words, this implies that there is a significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which internet literacy skills is utilized in Bayelsa State.

$H0_2$: There is no significant difference between the mean responses of male and female secondary school science students on the extent to which communication technology skills are utilized in Bayelsa State.

Table 4.6: t-test analysis on the extent to which communication technology skills are utilized in Bayelsa State

Category	N	Mean	St.D	d_f	P	t	Sig. (2-tailed)	Decision
Females'	259	1.573	.681	497	0.05	16.778	0.000	Accept Ho_2
Males'	240	2.710	.831					

Source: Fieldwork (2023)

From Table 4 above, the calculated t-value is 16.77 at 497 degree of freedom and 0.05 level of significance. Since the calculated t-value of 16.77 is greater than the critical table value of 1.96, the null hypothesis is rejected. In other words this implies that there is a significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which communication skills are utilized in Bayelsa State.

Discussion of Findings

Findings from research question 1, revealed that the extent to which Internet literacy skills is utilized among secondary school students in Bayelsa State is low. Also, the findings revealed that there is no significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which internet literacy skills is utilized in Bayelsa State. This supports Kulkarni (2021) who assessed the digital literacy skills among secondary school children in Abuja and reported that the extent of awareness was low. Furthermore, the finding of study was supported by Abazie (2021) who assessed the level of digital literacy and use of ICT resources by secondary school teachers in Awka South, Anambra State.

Findings from research question 2, revealed that the extent to which digital communication skills is utilized among secondary school students in Bayelsa State is low. Also, the findings revealed that there

is no significant difference between the mean ratings on the responses of male and female secondary school students on the extent to which communication skills are utilized in Bayelsa State. This supports Brume-Ezewu (2019) who examined information communication technology (ICT) and digital literacy skills as mechanism for effective teaching in Nigerian colleges of education and reported a low digital skill among learners.

Conclusion

The study has established that the extent to which internet literacy and digital communication skills is utilized among secondary school students in Bayelsa State is low. The study also affirmed that the extent to which internet literacy and digital communication skills is utilized among secondary school students in Bayelsa State does not differ with gender.

Recommendations

Based on the findings, the following recommendations were drawn:

1. Nigeria Communication Commission (NCC) and other stakeholders should continue to train students on how to improve literacy skills.
2. Nigeria Communication Commission (NCC) and other stakeholders should train students on digital communication skills in other to meet up with the 95% digital literacy target by the next ten years.
3. The school management should ensure that students are encouraged to acquire digital skills.

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