ASSESSMENT OF TEACHERS' DIGITAL COMPETENCE AND THE INFLUENCE OF TEACHING EXPERIENCE IN PUBLIC SECONDARY SCHOOLS IN IJEBU ZONE, OGUN STATE, NIGERIA

By

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Abstract

The integration of digital technologies in secondary education has become increasingly important for improving teaching and learning. However, teachers' competence in effectively utilising these tools differs, particularly across levels of teaching experience. This study assessed the digital competence of public secondary school teachers in Ijebu Zone, Ogun State, Nigeria, and examined whether teaching experience significantly influenced their competence. A descriptive survey research design was adopted. Using a multistage sampling technique, 315 public secondary school teachers were selected. Data were collected through a structured questionnaire and analysed using descriptive and inferential statistics, including mean, standard deviation, and t-test at the 0.05 level of significance. Findings showed that teachers' competence across all domains was moderate. The mean and standard deviation values were: information sourcing ($\bar{x}$ = 3.38, SD = 0.71), communication ($\bar{x}$ = 3.29, SD = 0.83), content creation ($\bar{x}$ = 2.83, SD = 1.17), safety ($\bar{x}$ = 3.26, SD = 0.87), and problem-solving ($\bar{x}$ = 2.73, SD = 1.05). The overall competence level was also moderate ($\bar{x}$ = 3.09, SD = 0.92). Results further indicated there is no significant difference in the digital competence levels of experienced and less-experienced teachers in public secondary schools [t(310)=1.31, p= 0.18]. The study concluded that although teachers demonstrated moderate competence in using digital technologies, gaps remained, particularly in content creation and problem-solving skills. It was recommended that digital training and capacity-building programmes be implemented with emphasis on ICT skills.

Keywords: Digital competence; Secondary school teachers; Teaching experience; Digital technologies; Teachers' competence.

Introduction

Digital technologies have become an essential component of modern educational systems, providing innovative avenues for lesson delivery, collaboration, information access, and assessment. As global education systems continue to embrace digital transformation, teachers' competence in utilizing digital tools has become a critical determinant of effective teaching and learning outcomes (Selwyn, 2021; Rapanta et al., 2020). In Nigeria, particularly in Ogun State, the integration of digital technologies into secondary education is increasingly gaining recognition; however, disparities persist in the level of competence demonstrated by teachers (Bamisaye & Oyetunji, 2020). Teachers' digital competence encompasses the ability to source information, communicate, create digital content, apply digital safety measures, and engage in problem-solving using technology. Nonetheless, studies indicate that while many educators possess basic digital skills, they often struggle with advanced competencies required for innovative and interactive instructional delivery (Jenkins et al., 2021; Mouza et al., 2020). Although digital tools such as smartphones are commonly used in schools, more advanced instructional technologies such as laptops, desktops and projectors remain underutilized due to infrastructural constraints and inadequate ICT support systems (Ogunleye & Adegbite, 2022).

Teaching experience has long been considered a significant factor in technology adoption in education. Some studies suggest that experienced teachers may demonstrate stronger pedagogical confidence but lag in technological competence compared to younger colleagues (Oluwagbemi & Ogunleye, 2021; Lai & Bower, 2019). Conversely, other studies argue that sustained professional development enables experienced teachers to build strong digital integration capacity (Gulbahar, 2020). Despite these differing perspectives, empirical evidence within Ogun State remains limited.

Digital competence refers to teachers' ability to use digital tools effectively for instructional planning, classroom delivery, communication, assessment and professional development. It involves the integration of knowledge, skills, and attitudes required to manage digital resources in teaching and learning environments. Gulbahar (2020) explained that digital competence extends beyond basic ICT literacy to include advanced skills such as digital content creation, information

evaluation, and online collaboration. Similarly, Selwyn (2021) emphasized that digital competence is now a core professional requirement, as teachers are expected to integrate technology in ways that enhance learner engagement and instructional outcomes. Jenkins et al. (2021) further noted that digitally competent teachers can utilize multiple technologies for interactive instruction, thereby improving student engagement and learning quality.

This study adopts the widely recognized European Digital Competence Framework (DigComp) developed by Vuorikari et al. (2016), which conceptualizes digital competence across five key domains: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. While Jenkins et al. (2021) provide a contextual adaptation of these domains, the present study aligns conceptually with the original DigComp framework as the primary reference point.

These dimensions include:

(i) Information and data literacy: searching, accessing, and evaluating digital information.
(ii) Communication and collaboration: using digital tools for interaction and knowledge sharing.
(iii) Digital content creation: developing and modifying instructional materials.
(iv) Safety: ensuring secure and responsible digital practices.
(v) Problem-solving: addressing technical challenges during instructional processes. Mouza et al. (2020) emphasized that effective teacher training programs must develop competence across these domains to support technology-enabled pedagogy.

Teaching experience has also been identified as a key factor influencing teachers' use of digital technology. Lai and Bower (2019) stated that less-experienced teachers, often digital natives, generally possess higher confidence and fluency in modern technologies due to early exposure. In contrast, experienced teachers may demonstrate stronger pedagogical judgment but slower adoption of emerging technologies, particularly where digital training is limited. However, Oluwagbemi and Ogunleye (2021) argued that continuous professional development can significantly enhance digital competence among experienced teachers, enabling effective

technology integration. This suggests that teaching experience alone does not determine digital competence; rather, training, exposure, and institutional support play critical mediating roles.

Digital competence is particularly important in secondary education, where students engage in research, digital projects and online learning environments. Ogunleye and Adegbite (2022) observed that competence levels among public secondary school teachers in Ogun State vary widely, with some demonstrating high proficiency and others constrained by limited resources and insufficient capacity-building initiatives. Similarly, Olatoye et al. (2020) found that although teachers generally possess basic ICT awareness, advanced digital teaching skills remain underdeveloped, limiting effective classroom integration. This underscores the need for continuous training and structured digital support systems.

Empirical studies across Nigerian and international contexts reveal varying levels of digital competence among teachers. Mouza et al. (2020) reported that many educators lack essential technology-integration skills necessary for 21st-century learning, although structured professional development significantly improves competence. Jenkins et al. (2021) also found that while teachers demonstrate familiarity with basic digital tools, gaps persist in advanced areas such as content creation and collaborative digital learning. In a related study, Olatoye et al. (2020) observed that although awareness of digital tools is high, proficiency levels vary considerably, with many teachers operating at foundational levels. Adeogun et al. (2021) further reported significant differences in digital competence across public secondary schools in Ogun State, attributing these disparities to unequal access to ICT facilities and training opportunities. Ogunleye and Adegbite (2022) similarly highlighted that inadequate infrastructure continues to hinder the development of teachers' digital competence.

Research on the relationship between teaching experience and digital competence presents mixed findings. Lai and Bower (2019) reported that novice teachers tend to adopt digital tools more easily due to generational familiarity, although experienced teachers demonstrate stronger pedagogical integration when supported with training. Conversely, Oluwagbemi and Ogunleye (2021) found that experienced teachers can attain high levels of digital competence through sustained exposure and professional development. Olatoye et al. (2020) also concluded that years of teaching

experience do not automatically translate to digital competence unless supported by intentional ICT capacity-building initiatives.

Within Ogun State, existing studies provide additional context. Adeogun et al. (2021) established that teachers' digital competence varies across schools, influenced by access to ICT training and infrastructure. Similarly, Ogunleye and Adegbite (2022) confirmed that disparities in digital resource availability significantly affect competence levels, reinforcing the need for targeted interventions.

Given the increasing emphasis on ICT-driven education, there is a need to assess teachers' digital competence in the Ijebu Zone of Ogun State and examine whether teaching experience significantly influences competence levels. This study therefore evaluates teachers' digital competence and investigates the influence of teaching experience in public secondary schools within the Ijebu Zone of Ogun State.

Statement of the Problem

Despite the recognized importance of digital technologies in teaching and learning, many public secondary school teachers struggle to effectively apply digital tools in classroom delivery. Challenges such as limited ICT infrastructure, insufficient training, and unequal exposure to technology continue to affect competence levels, existing literature in Ogun State suggests varying levels of digital competence among teachers, with some demonstrating proficiency in basic applications while others lack essential skills for digital instructional delivery. However, limited empirical studies specifically examine teachers' digital competence in Ijebu Zone, Ogun State. Furthermore, while teaching experience is frequently cited as a moderating factor, evidence on its influence on digital competence remains inconsistent. This study therefore seeks to fill this gap by assessing teachers' digital competence and examining whether teaching experience significantly influences competence levels in public secondary schools in Ijebu Zone, Ogun State.

Aim and Objectives of the Study

The study assessed the teachers' digital competence and the influence of teaching experience in public secondary schools in Ijebu Zone, Ogun State, Nigeria. Specifically, the objectives of the study were to:

(i) determine the digital competence levels of public secondary school teachers in Ijebu Zone, Ogun State.
(ii) determine if there is significant difference in the digital competence levels of experienced and less-experienced teachers in public secondary schools in Ijebu Zone, Ogun State.

Research Questions

1. What is the digital competence level of teachers in public secondary schools in Ijebu Zone, Ogun State?

Hypothesis

H_0: There is no significant difference in the digital competence levels of experienced and less-experienced teachers in public secondary schools in Ijebu Zone, Ogun State.

Methodology

The study adopted a descriptive survey research design. The population of the study was 2,781 teachers from public senior secondary schools in the Ijebu Zone of Ogun State. A multistage sampling procedure was employed. Three Local Government Areas (Ijebu-Ode, Ijebu North, and Ijebu East) were randomly selected, schools were proportionately sampled, and a final sample of 315 teachers was drawn from 1,482 using Taro Yamane's formula at a 5% margin of error and 95% confidence level. Data were collected using the researchers' self-develop structured instrument titled "Perceived Digital Competence of Secondary School Teachers Questionnaire" (PDCSTQ), comprising 25 items across five domains: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving, rated on a four-point Likert scale. The items were developed from established digital competence frameworks based on relevant literature, and were pilot-tested to ensure clarity and usability. Face and content validity were established through expert review, while reliability was confirmed using

Cronbach's Alpha coefficient of 0.87, indicating high internal consistency. Teachers were categorized as experienced (≥10 years of teaching experience) and less-experienced (<10 years). Data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (t-test) at the 0.05 level of significance.

Decision rule for the Likert-scaled items:

- 3.50 – 5.00 = High extent
- 1.50 – 3.49 = Moderate extent
- 0.00 – 1.49 = Low extent

Results

Research Question 1: What is the digital competence level of teachers in public secondary schools in Ijebu Zone, Ogun State?

Table 1

Overall perceived competence of the teachers.

	PERCEIVED COMPETENCE OF THE RESPONDENTS	HE F(%)	ME F(%)	LE F(%)	N F(%)	Mean	SD	D
INFORMATION								
1	I can source for information online using a search engine.	209 (66.3)	92 (29.2)	9 (2.9)	5 (1.6)	3.59	0.70	HE
2	I know how to use appropriate keywords in searching information.	165 (52.4)	135 (42.9)	13 (4.1)	2 (0.6)	3.46	0.63	ME
3	I can save or store files (Text, pictures, music, videos, and web) on any device.	165 (52.4)	130 (41.3)	20 (6.3)	0 (0.0)	3.46	0.61	ME
4	I can identify and utilize different types of online sources.	121 (38.4)	154 (48.9)	38 (12.1)	2 (0.6)	3.24	0.71	ME
5	I can recognize biased or misleading information online.	129 (41.0)	136 (43.2)	39 (12.4)	11 (3.5)	3.18	0.90	ME
			Average Mean Value			**3.38**	**0.71**	**ME**
COMMUNICATION								
6	I can communicate with others using mobile phone, (voice over, email, chat, sms).	247 (78.4)	56 (17.8)	7 (2.2)	5 (1.6)	3.71	0.66	HE
7	I can share files and content using digital technological tools such as phones, laptop.	195 (61.9)	110 (34.9)	6 (1.9)	4 (1.3)	3.56	0.66	HE
8	I can use digital technology tools such as phones, tablet device to interact with students.	166 (52.7)	114 (36.2)	31 (9.8)	4 (1.3)	3.39	0.76	ME
9	I can integrate videos, podcasts, and infographics to teaching.	98 (31.1)	125 (39.7)	79 (25.1)	13 (4.1)	2.94	0.96	ME
10	I can use discussion forums such as Google classroom and chat platforms.	103 (32.7)	110 (34.9)	77 (24.5)	25 (7.9)	2.86	1.12	ME
			Average mean Value			**3.29**	**0.83**	**ME**
CONTENT CREATION								
11	I can produce simple digital content such as (texts, tables, images, audio files) using technological device.	148 (47.0)	123 (39.0)	38 (12.1)	6 (1.9)	3.30	0.80	ME
12	I can make basic editing to content produced by others.	103	144	58	10	3.05	0.89	ME

		(32.7)	(45.7)	(18.4)	(3.2)			
13	I can modify simple function and settings of software and applications.	83 (26.3)	128 (40.6)	88 (27.9)	16 (5.1)	2.83	0.98	ME
14	I can produce educational videos, podcasts and animations.	79 (25.1)	88 (27.9)	113 (35.9)	35 (11.1)	2.56	1.19	ME
15	I can create visually appealing presentations using PowerPoint.	77 (24.4)	90 (28.6)	96 (30.5)	52 (16.5)	2.44	1.31	ME
			Average mean Value			**2.83**	**1.17**	**ME**
SAFETY								
16	I can take basic steps to protect my devices using anti-virus and password.	143 (45.4)	129 (41.0)	33 (10.5)	10 (3.1)	3.26	0.87	ME
17	I am aware that my credentials (username and password) can be stolen.	178 (56.5)	106 (33.7)	21 (6.7)	10 (3.2)	3.40	0.87	ME
18	I know I should not reveal my private information online.	221 (70.2)	70 (22.2)	18 (5.7)	6 (1.9)	3.59	0.76	HE
19	I can update operating systems, applications, and security software.	93 (29.5)	149 (47.3)	66 (21.0)	7 (2.2)	3.02	0.84	ME
20	I can identify and avoid fraudulent websites, and online scams.	121 (38.4)	118 (37.5)	59 (18.7)	17 (5.4)	3.03	1.02	ME
			Average mean value			**3.26**	**0.87**	**ME**
PROBLEM SOLVING								
21	I can find support and assistance when a technical problem occur.	129 (40.0)	125 (38.7)	47 (14.9)	14 (6.4)	3.16	0.93	ME
22	I know how to solve some routine problem, (internet connection, installation) on my devices.	96 (30.5)	145 (45.0)	55 (16.5)	19 (8.0)	3.00	0.87	ME
23	When confronted with a technological problem, I can use digital technological tools to solve it.	75 (23.8)	129 (41.0)	93 (29.5)	16 (5.1)	2.81	0.97	ME
24	I can diagnose and resolve common hardware and software problem.	67 (21.3)	95 (30.2)	112 (35.6)	41 (12.9)	2.50	1.19	ME
25	I can systematically troubleshoot problems with digital devices and software.	46 (14.6)	93 (29.5)	108 (34.3)	68 (21.6)	2.20	1.29	ME
			Average mean value			**2.73**	**1.05**	**ME**

Source: Field Survey, 2025

Table 1 revealed the analyses responses obtained from the participants of the study using four likert scale response format of the following High Extent (HE), Moderate Extent (ME), Low Extent (LE) and Never (N) across all competence area.

The result shown that teachers competence on the use of digital technologies for information sourcing has an average mean of ($\bar{x}$= 3.38; SD = 0.71) indicating moderate extent (ME). Teachers competence on the use of digital tools as it relates to communication had an average mean of ($\bar{x}$= 3.29; SD = 0.83), also indicating moderate extent (ME). The result also shows that the level of competence of the teachers on the usage of digital technologies for content creation had an average mean value of ($\bar{x}$ =2.83; SD=1.17). This also indicates moderate extent (ME). The table also reveals the competence of the teachers base on safety measures like protecting their devices on an average mean value of ($\bar{x}$= 3.26; SD=0.87) indicating as well moderate extent (ME). While it also shows the competence level of the teachers in problem solving using digital technologies having an average mean value of ($\bar{x}$=2.73; SD=1.05) also indicating Moderate Extent.

Conclusively, Base on the categorized decision-making of High Extent (HE) mean values of (5.00 – 3.50), Moderate Extent (ME) mean value of (3.49- 1.50) and Low Extent mean value of (1.49-0.0). The aggregate mean value of the competence in the use of digital technologies by public secondary school teachers in Ijebu Zone of Ogun State was ($\bar{x}$=3.09; SD= 0.92). This indicates moderate extent of their perceived competence level.

Testing of Hypothesis

Ho1: There is no significant difference in the perceived competence level of Ijebu zone of Ogun State public secondary teachers in the use digital technologies based on experience.

Table 2

t-test analysis of teaching experience on the perceived competence level of the use of digital technologies.

Experience of Teachers	N	Mean	Std. Dev	DF	T-value	Sig
Less experienced	96	78.83	10.66	310	1.31	0.189
Experienced	216	76.90	12.51			

Source: Field Survey, 2025.

The comparison of competence scores between teachers with different levels of experience shows that experienced teachers had an average competence score of 76.90, while less experienced teachers had an average score of 78.83. However, the difference between the two groups was not statistically significant; t(310)=1.31, p= 0.18. From the result above, it can be inferred that there is no significant different. Therefore, the hypothesis tested was not rejected.

Discussion of Findings

The findings of this study revealed that public secondary school teachers in Ijebu Zone of Ogun State demonstrated a moderate level of digital competence across all domains, including information sourcing, communication, content creation, safety, and problem-solving. This suggests that while teachers possess basic digital skills necessary for routine instructional tasks, they still lack advanced competencies required for effective digital pedagogy. This outcome is consistent with Olatoye et al. (2020), who found that teachers in Nigerian secondary schools generally exhibit foundational ICT skills but have limited proficiency in advanced instructional applications. Similarly, Mouza et al.

(2020) and Jenkins et al. (2021) emphasized that teachers' digital competence often remains at a basic level without structured and continuous professional development, particularly in areas such as content creation and problem-solving, which were also identified as weaker domains in this study.

With respect to the hypothesis tested, the result showed that teaching experience does not significantly influence teachers' perceived digital competence, as there was no statistically significant difference between less-experienced and experienced teachers ($t(310) = 1.31$, $p = 0.189 > 0.05$). Although less-experienced teachers recorded a slightly higher mean score, this difference was not significant, leading to the retention of the null hypothesis. This finding supports Olatoye et al. (2020), who argued that years of teaching experience do not automatically translate into digital competence unless accompanied by deliberate ICT training and exposure. It also aligns with the position of Oluwagbemi and Ogunleye (2021), who emphasized that continuous professional development, rather than experience, is the key determinant of teachers' digital competence.

Furthermore, the finding corroborates Gulbahar (2020), who conceptualized digital competence as a dynamic and learnable skill influenced by access to training, technological resources, and institutional support, rather than by length of service. While Lai and Bower (2019) suggested that less-experienced teachers may demonstrate greater technological fluency due to early exposure, and experienced teachers may rely more on pedagogical knowledge, the present study shows that these differences are not strong enough to produce a statistically significant gap. This implies that both categories of teachers operate at relatively similar levels of competence within the study context.

In line with Ogunleye and Adegbite (2022) and Adeogun et al. (2021), the findings further suggest that external factors such as access to ICT facilities, training opportunities, and institutional support systems play a more significant role in shaping teachers' digital competence than teaching experience. Therefore, the absence of a significant difference between the groups reinforces the need to focus on systemic interventions rather than demographic characteristics.

Overall, the study concludes that teachers possess moderate digital competence and that teaching experience is not a significant determinant of competence level, thereby upholding the null hypothesis. This underscores the importance of providing continuous, inclusive, and targeted digital training programmes for all teachers, irrespective of their years of experience, to enhance effective technology integration in teaching and learning.

Summary

This study examined the digital competence of public secondary school teachers in Ijebu Zone of Ogun State and investigated whether teaching experience significantly influences their competence in the use of digital technologies. A descriptive research design was adopted, with a population of 2,781 teachers. Using a multistage sampling technique and Taro Yamane formula, a sample of 315 teachers was selected. Data were collected using a structured questionnaire and analysed using descriptive statistics (mean, percentage and standard deviation) and inferential statistics (t-test) at the 0.05 level of significance.

The findings revealed that teachers demonstrated a moderate level of digital competence across all domains, including information sourcing, communication, content creation, safety, and problem-solving. While competence was relatively higher in basic digital operations such as communication and information access, lower competence was observed in more advanced skills such as digital content creation and problem-solving.

Furthermore, the study found that teaching experience did not significantly influence teachers' digital competence, as there was no statistically significant difference between less-experienced and experienced teachers ($t(310) = 1.31$, $p > 0.05$). This led to the retention of the null hypothesis, indicating that both categories of teachers possess relatively similar levels of digital competence.

Conclusion

Based on the findings of this study, it is concluded that public secondary school teachers in Ijebu Zone of Ogun State possess moderate digital competence, which is sufficient for basic instructional tasks but inadequate for advanced digital pedagogical practices. The study also concludes that teaching experience is not a significant determinant of digital competence, as both experienced and less-experienced teachers demonstrated comparable competence levels.

This implies that digital competence is not inherently dependent on years of teaching experience but is more strongly influenced by factors such as access to digital resources, exposure to technology, and participation in professional development programmes. Therefore, improving teachers' digital competence requires a systemic approach that prioritizes continuous training, capacity building, and institutional support rather than reliance on experience alone.

Overall, the study underscores the need for sustained and inclusive digital skill development initiatives to enhance effective technology integration in teaching and learning across all categories of teachers.

Recommendations

1. Regular Digital Training: Ministry of Education and school administrators should organize continuous professional development programmes to upgrade teachers' digital competence beyond basic ICT skills.
2. Targeted Capacity-Building: Special ICT empowerment schemes should be designed to support experienced teachers to bridge competence gaps and enhance digital instructional delivery.
3. Provision of Digital Resources: Government and school authorities should invest in digital instructional facilities and internet-enabled learning environments in public secondary schools.
4. In-School Digital Mentorship Teams: Schools should establish digital mentoring systems where digitally skilled teachers support others to improve competence.
5. Policy Support: Ogun State Ministry of Education should enforce policies mandating periodic ICT certification or training for teachers to sustain digital competence standards.

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