

# Digital Citizenship Among Tablet-Using In-Service Teachers at Public Secondary Schools in Kigoma Municipal, Tanzania

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## Abstract

The integration of digital tools in education has significantly altered teaching practices worldwide, including in Tanzania. This study examines the digital citizenship competencies among tablet-using in-service teachers in public secondary schools in Kigoma Municipal, Tanzania. Digital citizenship encompasses skills such as digital information literacy, online safety and privacy protection, digital communication and etiquette, and understanding digital rights and responsibilities. The study aims to identify variations in these competencies based on teachers' education levels and teaching experience.

Utilizing a questionnaire survey, data were collected from 347 teachers and analyzed using descriptive statistics and the Kruskal-Wallis test. The results reveal significant disparities in digital citizenship skills across education levels, with master's degree holders consistently outperforming bachelor's degree and diploma holders. Teaching experience also plays a role, with teachers having less than 10 years of experience showing higher digital literacy than those with over 21 years. However, no significant difference was found between teachers with 11–20 years of experience and those with fewer than 10 years in several domains.

The study highlights the importance of formal education and continuous professional development in improving digital competencies among educators. In particular, veteran teachers ("digital immigrants") demonstrate a need for targeted interventions to bridge the gap in digital skills with younger, more digitally savvy teachers ("digital natives"). The findings underscore the need for ongoing teacher training to ensure safe, effective, and ethical use of technology in Tanzanian schools.

**Keywords:** Digital citizenship, tablet-using teachers, digital information literacy, online safety and privacy, digital communication and etiquette, digital right and responsibility, education level, teaching experience

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## 1. Introduction

Digital technology in education has increased in the 21st century, offering new collaboration and information access opportunities. Tanzanian classrooms have changed pedagogically with digital resources. Technology integration has many benefits, but it also hinders adaptability and ICT deployment. This trend matches the global shift to digital education, which has changed pedagogical methods. Global educational policies, including Tanzania's, are prioritizing ICT to improve student outcomes and prepare them for the digital age, focusing on academic success and ethical digital citizenship.

Digital citizenship—online safety, information literacy, and responsible online behavior—is vital for students and educators. Rahim (2021) stresses that understanding digital citizenship's effects on education is

essential for encouraging ethical technology use by educators and students. Tablets for all secondary school teachers in Tanzania are a major step toward digital classrooms. According to Dunaway and Macharia (2021), digital citizenship affects negative online behaviors and learning outcomes, and these tablets help educators increase involvement and create dynamic learning environments.

Effective tablet use in education requires instructors to have digital citizenship skills. Kim & Choi (2018) say educators must master digital technologies, think critically about online content, and effortlessly integrate technology into their teaching. Prasetyo, Sumardjoko, and Muhibbin (2023) underline that project-based learning promotes online etiquette in student-teachers.

Given the growing use of digital technologies in Tanzanian classrooms, especially in Kigoma Municipal, secondary school educators' digital citizenship skills must be assessed. These include digital information literacy, online privacy protection, communication etiquette, and digital rights and responsibilities. Capuno et al. (2022) say instructors influence students' online behavior, notably in managing cyberbullying and protecting privacy. Understanding these dynamics concerning Kigoma Municipal secondary school teachers will improve the discussion on technology in education and ethical digital behavior.

## *2. Theoretical references*

### *2.1. Digital citizenship*

Teachers need a wide range of digital citizenship skills for ethical and secure online behavior. Schools should prioritize ethical information use, including copyright and intellectual property rights (Rahim, 2021). Teachers should model good digital citizenship and teach students (Dunaway & Macharia, 2021). Critical thinking helps educators assess online resources' accuracy, relevance, and usefulness (Jones & Mitchell, 2016). Developing these abilities can help educators teach critical thinking and digital information literacy.

Teaching digital citizenship in schools is crucial. Christensen et al. (2021) stress that schools must address internet safety, social media accountability, and digital traces. These projects help develop responsible digital citizens who understand the ramifications of their online actions.

Eshet-Alkalai (2016) stressed instructors' technological self-reliance. To ensure technology integration in education, educators must overcome fundamental technological issues. Digital citizenship for educators requires teamwork. Capuno et al. (2022) recommend professional development groups, resource sharing, and collaborative learning for digital literacy. The American Library Association (2019) stressed the need of professional development for educators' digital competency.

By following these digital citizenship standards, instructors improve their skills and set a standard for their students, promoting ethical and responsible online behavior in schools.

### *2.2. Digital Information Literacy and education attainment, and teaching experience*

Educators must evaluate information sources across platforms. This domain requires the ability to evaluate the information ecosystem's relevance, correctness, and dependability as it changes (American Association of School Librarians, 2007). Bruce (2002) believes that students who are information literate and actively seek out new platform abilities may better navigate the ever-changing digital ecosystem. This demography shows how information literacy may help instructors adapt to technology.

Copyright and intellectual property rights support ethical information use, which information literacy promotes. Equipping educators with an ethical framework for information use promotes integrity (Rahim, 2021). It aids educators in data analysis, study evaluation, and evidence-based decision-making, say Dervin

and Nilan (1986). This practical application improves expertise and helps create technology-aligned lesson plans (UNESCO, 2011). Eshet-Alkalai (2004) claims that well-informed teachers can handle technological challenges on their own. Teachers use students' information literacy to evaluate digital media projects and find reputable sources (American Library Association, 2000). As information literacy educators improve student and colleague digital literacy, collaboration is affected.

Teaching experience greatly affects information literacy. Modern educators are called 'digital natives' (Prensky, 2001) due to their digital knowledge. They are proficient in using online databases, assessing digital sources, and smoothly incorporating digital resources into their education (AAC&U, 2007). Senior educators, often called 'digital immigrants,' may have felt pressure to adopt new technology through their careers. Despite their expertise, they may need additional training to teach information literacy (Prensky, 2001). Age affects information literacy outliers (Bruce, 2002).

Teachers' information literacy depends on their training. Higher-educated teachers grasp information literacy better (Mossberger et al., 2008). They enjoy creating research projects, teaching students how to obtain information, and assessing varied sources. Low-educated teachers may have had poor information literacy tools (AAC&U, 2007). Despite classroom differences, professional development can increase educators' information literacy skills (UNESCO, 2011).

Years of experience might affect an educator's information literacy. Many experienced instructors have improved their skills by teaching pupils different research methods. Their expertise lies in helping students find reliable sources, evaluate course material, and use digital tools in their studies. Technically proficient teachers without classroom experience may benefit from information literacy courses (Zhao, 2002). Mentorship, education, and information literacy can reduce this gap (UNESCO, 2011).

*H1a: The level of digital information literacy among tablet-using in-service teachers varies significantly across education levels.*

*H1b: The level of digital information literacy among tablet-using in-service teachers varies significantly across teaching experience.*

### 2.3. Online safety and privacy protection and Level of Education and Years of Experience

Responsible digital citizenship requires online anonymity and security. According to the Federal Trade Commission (2018), educators and students must protect personal information such as home addresses, phone numbers, and academic records. Protecting sensitive data is moral, legal, and necessary. Data security and confidentiality are essential for protecting student and school data (U.S. Department of Education, 2014). To show commitment, educators must manage digital assets and share safely (Common Sense Education, 2021). As key characters in their students' lives, educators must protect them online. Empowering students to secure their personal information, recognize privacy concerns, and make informed technology use decisions, including changing privacy settings on varied platforms and social media, gives them autonomy (Ribble, 2015). This improves online security by letting consumers control their data (Privacy Rights Clearinghouse, 2021). Student data must be used responsibly for instructional purposes without illegal or commercial exploitation (Common Sense Education, 2021). Instructors must understand cybersecurity and safeguard their devices and accounts to protect student data and privacy, according to NIST (2017).

Educators lose confidentiality with age. Young educators, known as 'digital natives,' were nurtured with computers and the internet (Prensky, 2001). This generation uses complex passwords and manages their social media accounts. However, 'digital immigrants,' older educators who adopted digital technology later in their careers (Prensky, 2001), may need more training to recognize and handle digital privacy issues (Common

Sense Education, 2021). Individuals can vary from age-related privacy trends (Common Sense Education, 2021).

Education determines how well educators secure student data. Mossberger et al. (2008) claim postgraduate educators comprehend digital privacy ethics better. They know student data best practices, confidentiality, and data protection laws. Teachers without degrees may have been less likely to get student privacy training (Common Sense Education, 2021). It is crucial to remember that each student cohort is unique. Professional development can help all educators enhance their privacy protection skills (UNESCO, 2011).

Information security is greatly impacted by education. Professional educators have addressed student privacy issues, helping them grow (Bauer & Kenton, 2005). They specialize in student data, privacy, and digital assets. Less experienced educators may be learning about student privacy despite their digital technology proficiency (Zhao, 2002). Professional growth, mentorship, and privacy protocol training from Common Sense Education (2021) and UNESCO (2011) can benefit individuals.

*H2a: The level of online safety and privacy among tablet-using in-service teachers varies significantly across education levels.*

*H2b: The level of online safety and privacy among tablet-using in-service teachers varies significantly across teaching experience.*

## *2.4. Digital Communication and etiquette and Level of Education and Years of teaching Experience*

Teachers of digital citizenship who work with technology must have strong communication skills for the digital age. Teaching and learning are both enhanced by students seeing adults with strong digital communication skills act responsibly and politely when using the internet. With these skills, educators may lead and moderate class conversations in a way that fosters mutual regard and positive connections (Salmon, 2002). Proper email protocol allows for immediate and unambiguous contact with coworkers, parents, and students (Hrastinski, 2008). Educators that possess these abilities are better able to collaborate with both internal and external stakeholders, which in turn improves education and resource sharing (Nicol & Macfarlane-Dick, 2006). A positive virtual learning environment can be established through the prompt and constructive delivery of feedback on assignments and assessments through digital communication (Rheingold, 2010). Teachers can utilize social media platforms like Twitter, Facebook, and Instagram for educational purposes as long as they adhere to established guidelines for appropriate online conduct and uphold educational values (Tapscott, 1998).

Digital communication is significantly impacted by the age of an educator. Younger educators, often referred to as 'digital natives,' have a leg up when it comes to using various forms of online communication because of their extensive upbringing with technology (Prensky, 2001). This group is familiar with digital messaging, online collaboration, and social media. More senior teachers, sometimes referred to as 'digital immigrants,' may have had to learn how to use computers and other digital tools later in their careers. Despite their expertise, these individuals might benefit from additional instruction in the use of digital communication tools (Tapscott, 1998). There are outliers in this age-based pattern, indicating that digital communication skill is not predicted by chronological age (Hrastinski, 2008).

For educators, the ability to communicate effectively through digital means is fundamental. By delving further into communication theory and practice, graduate degrees enhance digital communication abilities (Mossberger et al., 2008). They excel at utilizing digital resources for training, providing helpful criticism, and presiding over online debates. Online communication abilities may be lacking among teachers who have had less formal education since they have been less exposed to ideas and practices of communication

(Hrastinski, 2008). It is essential to acknowledge the uniqueness of each student in the classroom (Common Sense Education, 2021).

Teachers' proficiency with digital communication abilities is tenure-dependent. It is believed that teachers' communication abilities have been enhanced through long-term classroom participation. Online learning environments allow these teachers to use digital platforms for tutorials and engage students in virtual dialogues. Even if they are technically savvy, teachers who have little experience with digital communication may still benefit from professional development opportunities (Nicol & Macfarlane-Dick, 2006). Assistance is available through online communication training, ongoing professional development, and personalized mentoring (Rheingold, 2010).

An increasingly important part of teachers' digital communication practices is digital etiquette, which includes being respectful and ethical when online (Ribble & Bailey, 2007). Encouraging responsible social media use, preventing cyberbullying, and maintaining professional email habits are crucial in developing welcoming and safe spaces for online education (Common Sense Education, 2021). Additionally, teachers have a crucial responsibility in teaching students about proper online behavior and encouraging them to be responsible citizens who use technology responsibly (Ribble & Bailey, 2007).

*H3a: The level of digital communication and etiquette among tablet-using in-service teachers varies significantly across education levels.*

*H3b: The level of digital communication and etiquette among tablet-using in-service teachers varies significantly across teaching experience.*

## 2.5. Digital rights and responsibilities and Level of Education, and Years of teaching Experience

Teachers must grasp digital citizenship, including online rights and obligations, before using technology in the classroom. Skills include recognizing digital rights and their ethical obligations. Students must practice and learn these values to create an ethical and respectful online community.

Protecting personal data when using digital technology is essential. Teachers prioritize student and instructor online privacy. Data must be secured, and internet privacy regulations observed (Common Sense Education, 2021). Good digital citizenship includes online free and responsible expression. Ribble and Bailey (2007) state that teachers must promote polite and open student conversation and set online discourse limitations. Copyright and intellectual property education is also needed. When using digital resources, students must follow copyright laws and give credit (United States Copyright Office, 2021). Cyberbullying must be stopped by digital citizens. Teachers teach students web safety and respect. They must also prioritize cyberbullying prevention (Hinduja & Patchin, 2015). We must control our internet traces morally and legally. Teachers must teach students how internet behavior affects their jobs and personal lives (Boyd, 2007). Digitized people deserve internet security. Children should learn data protection and online safety, says the National Cyber Security Centre UK (2018). Educators must use social media ethically. Getting along with pupils and coworkers is crucial (Ribble & Bailey, 2007). Digital rights and duties include technology ethics. Educators should encourage learning with digital tools and discourage their misuse (Spinello, 2013).

Age greatly impacts teachers' digital rights and obligations. Teaching technology ethics and law is easier for 'digital natives,' or teachers born and bred in the digital age. Senior instructors, frequently called 'digital immigrants,' may need greater training to use modern resources (Prensky, 2001; Boyd, 2007).

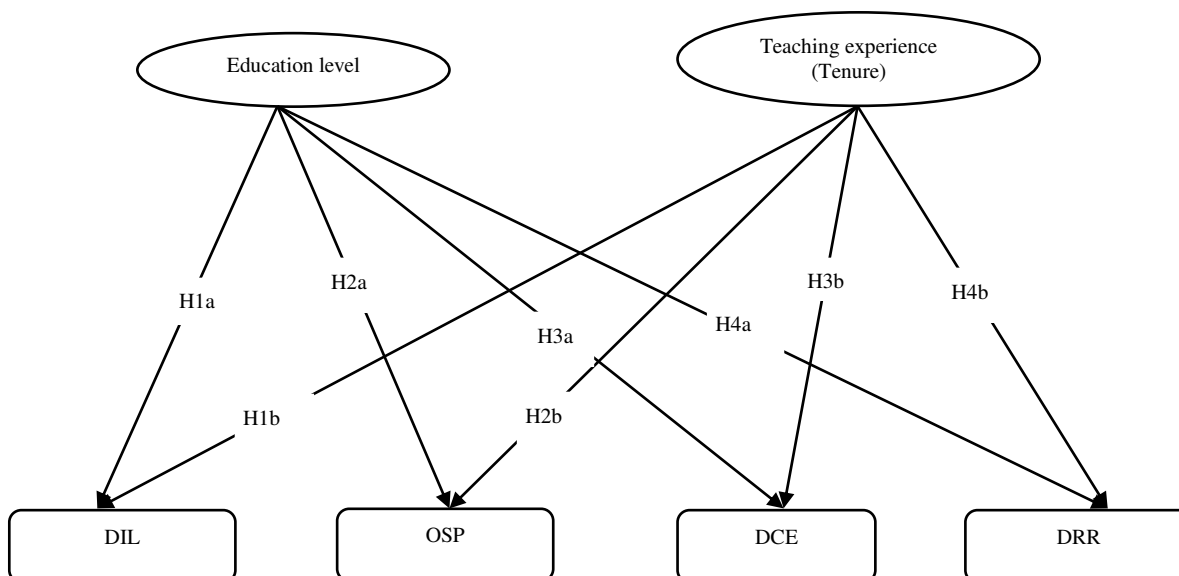
Gender affects teachers' digital rights and obligations less than other groups. Gender may influence privacy and security practices. Reichheld et al. (2000) and Hinduja and Patchin (2015) found that women may use the

internet more privately. Education affects digital rights and obligations. Master's-level teachers comprehend digital citizenship's ethical and legal implications, including copyright, data privacy, and intellectual property rights (Mossberger et al., 2008). Non-college teachers may not have grasped these concepts (Common Sense Education, 2021).

Teaching experience greatly affects teachers' digital rights and responsibility. Technological integration into the classroom has presented educators with ethical and legal challenges as they practice (Bauer & Kenton, 2005). Despite their IT skills, new instructors may be learning their digital rights and duties. Supervisors, mentors, and professional development can help (Common Sense Education, 2021). Demographics affect educators' digital rights and duties; customized help and training should accommodate for this. We must recognize that all instructors may improve professionally. Educational institutions may help teachers navigate the digital world ethically by providing detailed instruction and supporting professional development.

*H4a: The level of digital rights and responsibilities among tablet-using in-service teachers varies significantly across education levels.*

*H4b: The level of digital rights and responsibilities among tablet-using in-service teachers varies significantly across teaching experience.*



Note: Digital Information Literacy (DIL), Online safety and privacy protection (OSP), Digital Communication and Etiquette (DCE) and Digital Right and Responsibility (DRR)

Figure 1. Hypothetical research model

### 3. Methodology

Teachers in Kigoma Municipal, Tanzania, who have been given tablets to use in the classroom will have their digital citizenship skills evaluated and understood in this project. Methods for collecting and analysing



numerical data on digital citizenship skills were employed in this study [Creswell & Creswell 2017]. The researcher used a two-part questionnaire that they had developed themselves. In the first part of the survey, respondents were asked about basic demographics like year of study, level of education, and professional development status. Section 2 evaluated digital citizenship abilities in four dimensions: knowledge of digital information literacy, online safety and privacy protection, digital communication and etiquette, and digital rights and responsibility. A four-point Likert scale was used to assess the level of agreement among the participants, with 1 representing strong agreement and 4 representing significant disagreement.

Using descriptive statistics, the study compiled and displayed the participants' ability levels [Underwood, 2007]. The purpose was to identify any disparities in digital citizenship abilities among in-service teachers who use tablets, taking into account their years of experience in the field and their level of education. Using a non-parametric statistical test called the Kruskal-Wallis test, the study compared digital citizenship skills among teachers with varying degrees of education, professional development, and years of experience. The results were presented in a table, including the mean rank of each group and pairwise comparisons. To further investigate the nature of these differences, post-hoc tests were used to compare the teaching experience groups with each other, and t-statistics were used to measure the degree of difference between each pair of groups.

This study aimed to discover the relationship between teaching tenure and digital citizenship competency by classifying teachers into three groups according to their years of experience: those with less than 10 years, 11–20 years of experience, and those with 21 years or more. It also examined the variation in digital citizenship based on teachers' levels of education by classifying educational attainment into three levels: diploma certificate, bachelor's, and master's. The overarching goal was to shed light on the variables impacting digital citizenship competency among tablet-using educators in Kigoma municipality by describing how these abilities range across various educational backgrounds and year of teaching experience. Features and normality of the data informed the selection of these test models [Creswell & Creswell 2017]. Features and normality of the data informed the selection of these test models

When comparing three or more distinct groups, the Kruskal-Wallis test can be utilized as a non-parametric statistical tool to identify statistically significant differences. A table was used to display the Kruskal-Wallis test findings, including pairwise comparisons and the mean rank of each group. Pairwise comparisons between the groups based on teaching experience were carried out using post-hoc testing to delve deeper into the sources of these differences. In order to determine how significantly different each set of groups was from one another, the post-hoc tests employed t-statistics.

#### 4. Participants

To ensure a representative sample, 347 potential educators were chosen using a random sampling method in which every instructor had an equal chance of being chosen [Bryman, 2016]. The distribution of participants based on gender, education level, and teaching experience was considered. Among the respondents, 236 (53.8%) were female, while 203 (46.2%) were male, indicating a relatively balanced representation across genders. In terms of education level, the majority of participants held a bachelor's degree (396, 90.2%), followed by a smaller proportion with a diploma (28, 6.4%), and even fewer with a master's degree (15, 3.4%). This distribution suggests a predominantly well-educated sample, with a significant portion having completed undergraduate studies.

Regarding teaching experience, the data illustrates varying lengths of tenure within the profession. Approximately half of the participants (220, 50.1%) reported having less than 10 years of teaching experience, while 202 (46%) had between 11 and 20 years of experience. A smaller fraction, constituting only

17 (3.9%) of the respondents, indicated having 21 years or more of teaching experience. This distribution highlights a diverse range of experience levels among the teachers in Kigoma Municipality, with a substantial portion having relatively early or mid-career status, and a smaller yet notable group with extensive teaching experience.

#### 4. Instrument reliability

The table 1 offers insights into the internal consistency reliability of four variables relevant to a study: digital information literacy, online safety and privacy protection skills, digital communication and etiquette skills, and digital rights and responsibilities. Cronbach's Alpha coefficients, alongside the number of items comprising each variable, shed light on the reliability of measurement within these constructs. The dependability of digital citizenship abilities when one way to evaluate the validity and trustworthiness of a survey or questionnaire is to look at its Cronbach's Alpha value. Each of the four variables has an appropriate Cronbach's Alpha coefficient, meaning they are internally consistent and reliable (0.7 or higher) [Nunnally, 1978]. These results demonstrate the dependability of the examined constructs and verify the measuring tools utilised to evaluate aspects of digital citizenship skills.

Table 1: Reliability analysis results for digital citizenship skills scales

Variables	Cronbach's Alpha	No of item
Digital information literacy	886	11
Online Safety and Privacy Protection Skills	790	12
Digital Communication and Etiquette Skills	812	12
Digital rights and responsibilities	875	12

#### Normality

Table 2 shows the skewness and kurtosis values deviations from normality across the variables. Information Literacy shows a right-skewed, leptokurtic distribution (skewness: 1.25, kurtosis: 4.78), indicating more lower scores and heavier tails. Online Safety and Privacy Protection is left-skewed with a platykurtic distribution (skewness: -0.85, kurtosis: 2.10), showing more high scores and lighter tails. Digital Communication and Etiquette has a positively skewed, leptokurtic distribution (skewness: 1.60, kurtosis: 5.12), with more lower scores and heavy tails. Finally, Digital Rights and Responsibilities displays approximate symmetry (skewness: 0.20), but with a mildly leptokurtic distribution (kurtosis: 3.40), indicating a slight deviation from normality. Overall, these values suggest that most variables are not normally distributed, justifying the use of non-parametric methods.

Table 2: Data normality results by Skewness and Kurtosis test

Variable	Skewness	Kurtosis	Interpretation
Digital information literacy	1.25	4.78	Positively skewed; Leptokurtic (heavy tails)
Online safety and privacy protection	-0.85	2.10	Negatively skewed; Platykurtic (light tails)
Digital communication and etiquette	1.60	5.12	Positively skewed; Leptokurtic (heavy tails)
Digital right and responsibilities	0.20	3.40	Approximately symmetric; Mildly leptokurtic



## 5. Findings

Table 3: Kruskal-Wallis and post-hoc comparisons analysis of variation in digital information literacy (dil) skills based on teaching experience and education level

Category sample	Mean rank	Pairwise comparison Sample 1-Sample 2	T.Statistic	Std t- statistic	Sig
Diploma certificate	23.84	Diploma certificate-master's degree	-317.594	-7.872	.000
Bachelor degree	229.27	Diploma certificate-bachelor degree	-205.437	-8.331	.000
Master's degree	341.43	Bachelor degree-master's degree	-112.163	-3.382	.002
Less than 10 years	222.07	21 >years ---- <10 years	135.383	4.416	.000
11-20 years	228.26	21 > ---- years 11-20 years	141.576	4.324	.000
21 years above	86.69	< 10 years ---11-20 years	--6.193	-0.505	1.00

The Kruskal-Wallis test (table 3) demonstrated significant education-level disparities in in-service teachers' digital information literacy. Master's degree holders rated highest (341.43), bachelor's degree holders second (229.27), and diploma holders last (23.84). Post hoc tests showed significant differences between diploma and master's degree holders ( $p = 0.000$ ,  $t = -7.872$ ) and bachelor's and diploma holders ( $p = 0.000$ ,  $t = -8.331$ ). Teachers with over 21 years of experience had higher digital literacy than less experienced teachers ( $p$ -values  $< 0.05$ ). Digital literacy is similar for teachers with 11–20 years of experience (mean rank: 228.26) and those with fewer than 10 years (mean rank: 222.07), with no statistical significance ( $p = 1.000$ ). Teachers with over 21 years of experience (mean rank: 86.69) have worse digital literacy than both groups ( $p = 0.000$ ,  $t = 135.383$ ). Teachers with 11–20 years of experience are more digitally literate than those with 21+ years ( $t = 141.576$ ,  $p = 0.000$ ).

Table 4: Kruskal-Wallis and Post-Hoc comparisons Analysis of Variation in online safety and privacy (OSP) Skills Based on Teaching Experience and Education Level

Category sample	Mean rank	Pairwise comparison Sample 1-Sample 2	T.Statistic	Std t- statistic	Sig
Diploma certificate	31.11	Diploma certificate-master's degree	-197.678	-8.024	.000
Bachelor degree	228.79	Diploma certificate-bachelor degree	-309.560	-7.679	.000
Master's degree	340.67	Bachelor degree-master's degree	-111.881	-3.376	.002
Master's degree	428.97	Bachelor degree-master's degree	-205.656	-6.183	.000
Less than 10 years	227.68	21 >years ---- <10 years	142.810	4.306	.000
11-20 years	222.72	21 > ---- years 11-20 years	147.776	4.530	.000
21 years above	79.91	< 10 years ---11-20 years	4.965	0.405	1.00

Table 4 for the Kruskal-Wallis test showed that in-service teachers' Online Safety and Privacy Protection Skills varied by education level ( $p = 0.000$ ). Master's degree holders scored highest (340.67), bachelor's degree holders second (228.79), and diploma holders last (31.11). Diploma holders scored significantly lower than bachelor's ( $t = -7.679$ ,  $p = 0.000$ ) and master's ( $t = -8.024$ ,  $p = 0.000$ ) degree holders. Bachelor's-degreed teachers had considerably lower skills than master's-degreed ones ( $t = -3.376$ ,  $p = 0.002$ ). Experienced teachers have significantly different online privacy and safety skills ( $p = 0.000$ ) according to the Kruskal-Wallis test. Teachers with fewer than 10 years of experience ranked highest (227.68), followed by 11–20 years (222.72). Teachers with 21+ years of experience had the lowest mean rank (79.91), indicating worse competence. Teachers with 21+ years of experience showed significant differences from those with less experience ( $t = 142.810$  and  $t = 147.776$ ,  $p < 0.05$ ). Compared to less experienced teachers, 11–20-year teachers were more proficient ( $t = 4.965$ ).

Table 5: Kruskal-Wallis and Post-Hoc comparisons Analysis of Variation in Digital Communication and Etiquette Skills Based on Teaching Experience and Education Level

Category sample	Mean rank	Pairwise comparison Sample 1-Sample 2	T.Statistic	Std t- statistic	Sig
Diploma certificate	23.07	Diploma certificate-master's degree	-206.718	-8.382	.000
Bachelor degree	229.79	Diploma certificate-bachelor degree	-306.095	-7.585	.000
Master's degree	329.17	Bachelor degree-master's degree	-99.378	-2.996	.008
Less than 10 years	218.07	21 >years ---- <10 years	131.722	4.034	.000
11-20 years	232.63	21 > ---- years 11-20 years	146.287	4.467	.000
21 years above	86.34	< 10 years ---11-20 years	-14.565	-1.187	.706

Based on education, (table 5) the Kruskal-Wallis test showed substantial disparities in digital communication and etiquette. Teachers with master's degrees had the highest mean rank (329.17), followed by bachelor's (229.79) and diploma (23.07). Master's vs. diploma ( $t = -206.718$ ), bachelor's vs. diploma ( $t = -306.095$ ), and master's vs. bachelor's ( $t = -99.378$ ) exhibited statistically significant differences. Each p-value was below 0.05, indicating significant differences. Teachers with higher education levels were better at digital communication and etiquette, showing education helps build these skills. Teachers with 11–20 years of experience had the highest mean rating (232.63) for digital communication and etiquette abilities, followed by those with less than 10 years (218.07). Teachers with 21+ years of experience had the lowest mean rank (86.34), indicating inferior proficiency. Teachers with 21+ years differed from both other groups ( $t = 131.722$ ,  $p = 0.000$ ). In digital communication and etiquette, teachers with 11–20 years and those with fewer than 10 years showed no significant difference ( $t = -1.187$ ,  $p > 0.05$ ).

Table 6: Kruskal-Wallis and post-hoc analysis of variation of Digital Rights and Responsibilities among in-service teachers based on educational attainment and teaching experience

Category sample	Mean rank	Pairwise comparison Sample 1-Sample 2	T.Statistic	Std t- statistic	Sig
Diploma certificate	61.23	Diploma certificate-master's degree	-162.078	-6.555	.000
Bachelor degree	223.31	Diploma certificate-bachelor degree	-367.735	-9.089	.000
Master's degree	428.97	Bachelor degree-master's degree	-205.656	-6.183	.000
Less than 10 years	243.86	21 >years ---- <10 years	94.631	2.882	.012
11-20 years	202.94	21 > ---- years 11-20 years	185.549	4.140	.000
21 years above	108.31	< 10 years ---11-20 years	40.918	3.325	.003

Table 6 indicates the education level significantly affected digital rights and duties comprehension, according to the Kruskal-Wallis test. Diploma holders ranked lowest (61.23), followed by master's degree holders (428.97) and bachelor's degree holders (223.31). Post-hoc analysis demonstrated substantial differences between diploma, bachelor's, and master's holders ( $p = 0.000$ ). The most competent teachers in digital rights and responsibilities were master's degree holders, followed by bachelor's degree holders. Diploma holders were the least proficient, demonstrating the link between education and digital literacy. The results showed considerable teaching experience disparities in digital rights and responsibilities. Teachers with less than 10 years of experience had the highest mean rank (243.86), indicating the most proficiency, followed by 11–20 years (202.94). The lowest was 108.31 for teachers over 21. Pairwise comparisons demonstrated significant differences between 21+ year teachers and those with 10–20 years ( $t = 94.631$ ,  $p = 0.012$ ) and 11–20 years ( $t = 185.549$ ,  $p = 0.000$ ). Teachers with fewer than 10 years varied from those with 11–20 years ( $t = 40.918$ ,  $p = 0.003$ ).

## 6. Discussion

In-service educators' digital literacy, communication, and responsibility skills vary greatly, as shown by the Kruskal-Wallis test. Teachers with advanced degrees, especially master's degrees, often outperform those with bachelor's degrees and diplomas in many digital skills. Mossberger et al, [2008] UNESCO, [2011] agree that education is crucial to developing critical digital literacy and ethical, technological, and pedagogical technology use.

The study found that master's-degreed educators are more involved with digital tools and can critically evaluate and ethically use information [Eshet-Alkalai, 2004]. Due to their experience, [Mossberger et al, 2008] says educators with postgraduate degrees can navigate complex digital worlds better. The large gap between diploma holders and advanced degree holders shows the importance of formal education in developing these skills [America Association of School Librarians, 2000].

Teaching experience alone did not significantly affect digital information literacy, especially among educators with fewer than 10 years of experience compared to those with 11-20 years ( $p = 1.000$ ). Zhao et al [2002] agree that computer literacy requires continual professional development beyond classroom experience. Older teachers ('digital immigrants') may struggle to adapt to rapidly changing digital technology compared to younger 'digital natives' [Prensky, 2001], emphasizing the need for targeted interventions. Technology-integrated professional development can reduce this imbalance [Beuer & Kenton 2005].

The Kigoma municipal tablet-using in-service teachers study showed that education is key to internet safety and privacy protection competencies. Teachers with master's degrees outnumber those with bachelor's degrees and certificates. The findings support Bauer and Kenton [2005]'s claim that low-educated teachers often lack digital privacy expertise. Ribble [2015] stresses the importance of educators understanding the ethical and legal implications of handling student data in the digital age [Federal Trade Commission, 2018]. Younger educators are better at online safety, supporting [Prensky, 2001] digital natives theory. Experience does not guarantee competency, as teachers with 11-20 years of experience also have strong competencies [UNESCO, 2011]. Veteran educators, especially those over 21 years old, had the lowest online safety competency, highlighting the need for ongoing professional development to ensure all instructors can protect student privacy online [Common Sense Education, 2021].

Master's-level instructors excel at digital communication and etiquette. According to Mossberger et al [2008], higher education improves educators' communication theory and practice knowledge. Advanced-degreed teachers are better at managing online interactions and promoting good digital citizenship in the classroom [Hrastinski, 2008, & Salmon, 2002]. Higher-degreed educators give better feedback in digital learning environments, fostering respect and productivity [Nicol & Macfarlane, 2006, & Prensky, 2001]. Teachers with 11-20 years of experience performed well, while those beyond 21 performed poorly. This gap emphasizes the need for continual professional development, especially for seasoned educators who may struggle with digital tools [Tapscott, 1998]. Ribble and Bailey [2007] state that digital etiquette and communication must be constantly updated to remain relevant in education.

Examination of digital rights and responsibilities emphasizes formal education. Master's-degreed educators are the most proficient, followed by bachelor's-degreed educators, and certificate holders are the least. Mossberger et al [2008] found that higher education raises understanding of digital ethics, copyright laws, and data privacy. Spinello [2013] stresses that diploma holders need additional training in copyright and intellectual property law for digital citizenship.

Educators with less than 10 years of experience outperform those with more. According to Prensky, [2001], digital natives are more tech-savvy than digital immigrants. Senior educators must keep up with

digital rights, privacy, and cyberethics professional development [Common Sense Education, 2021, & Hinduja & Patchin, 2015]. Resolving these issues requires mentoring and ongoing training [Bauer & Kenton, 2005].

## 7. Conclusion

This study underlines the importance of education and teaching experience on in-service teachers' digital literacy, communication, online safety, and digital rights. The Kruskal-Wallis test frequently shows that educators with advanced degrees, especially master's degrees, outperform those with bachelor's degrees and certificates in numerous digital competency domains. Current research shows that formal education promotes critical digital literacy, communication skills, and ethical technology use [Mossberger et al 2008, UNESCO, 2011, & Eshet-Alkalai, 2004].

The study highlights that education is essential for increasing digital skills, but seasoned educators with over 21 years of expertise need continual professional development. Senior educators, called 'digital immigrants' [Prensky, 2001], are less proficient in digital information literacy, online safety, and communication than their younger counterparts, the 'digital natives.' Closing this gap and enabling all educators, regardless of experience, to adapt to new digital tools and environments requires targeted interventions, continuing training, and mentorship programs [Bauer & Kenton, 2005, Common Sense Education, 2021].

The study emphasizes online safety and privacy, especially as education becomes more digital. To provide a safe and accountable digital learning environment, teachers must grasp student data management ethics and law [Ribble, 2015 & Federal Trade Commission, 2018]. Results show that teachers with lower educational levels often struggle in this arena, emphasizing the need for thorough data protection and cyberethics training.

Digital literacy requires greater education, but experience alone does not guarantee proficiency. Teacher professional development is crucial, especially for senior teachers who may struggle with digital technology. Through constant education and professional development, schools can ensure that all teachers have the digital skills to create safe, effective, and ethical learning environments.

## 8. Recommendation

Veteran instructors over 21 had decreased digital competency. These educators need mentorship programs, collaborative learning opportunities, and specialized courses to stay current with technology. This may include refresher classes on new technology, privacy laws, and ideal online communication.

Teacher education programs must include digital citizenship modules to ensure new teachers have strong digital literacy skills. To prepare educators for digital learning, this training should include ethical online conduct, information assessment, and student data security.

Specialized, ongoing professional development on digital citizenship competencies is needed for educators, especially those with qualifications and over 21 years of experience. Training should cover digital information literacy, online safety, digital communication, and digital rights and responsibilities. The programs must be practical and include experiential workshops to improve digital skills.

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