

Developing Digital Citizenship as Crisis Competence among Primary School Pupils in Kwara State Nigeria through Storybook Based Instruction

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Abstract

Digital public services increasingly underpin crisis response, yet the competencies citizens need are rarely cultivated from early education. This study reframes digital citizenship as crisis competence, testing whether story-based instruction, using Click Smart: Adventures in Digital Citizenship for Children, prepares primary pupils in Kwara State, Nigeria for engagement with digital public systems. A pre-test/post-test design tracked changes in online safety awareness, ethical behaviour, critical evaluation, and participation after librarian-facilitated lessons. Findings show pupils hold basic operational skills but that targeted instruction markedly improves critical judgement and risk awareness, positioning school libraries as sites for early readiness in crisis-driven digital government.

Introduction

Governments now rely heavily on digital platforms to deliver public services, especially during periods of crisis such as health emergencies, security challenges, and environmental disruptions. In such situations, access to timely and credible information, and the ability to act on it appropriately, shape how individuals and communities respond. Much of the research on digital government has concentrated on infrastructure and system design, with less attention given to the capabilities citizens need in order to use these systems effectively.

Digital citizenship offers a useful way of thinking about these capabilities. It refers to the knowledge, skills, and values required for responsible participation in digital environments, including online safety, ethical behaviour, critical evaluation of information, and respectful interaction (Ribble, 2015). In education, it is often treated as a general life skill. Yet in moments of crisis, these same competencies take on greater importance, as individuals must interpret official messages, judge the credibility of information, and make decisions that may affect their safety and that of others. This suggests that digital citizenship can also be understood as a form of preparedness for engaging with digital public services under pressure.

Work in information behaviour supports this view. When people face uncertainty or risk, their need for information becomes more urgent, and the consequences of using poor information become more serious (Case & Given, 2016). Digital environments increase both the availability of information and exposure to misleading content. Without the ability to evaluate sources and act responsibly, individuals may be more vulnerable to misinformation and poor decision-making.

Despite these concerns, studies of digital government and crisis communication have focused mainly on adults, often assuming a level of competence that is not evenly distributed. Children receive far less attention, even though they are already interacting with digital technologies and will become future users of digital public services. For many primary school pupils, digital practices are shaped by informal experiences, which may leave gaps in areas such as critical evaluation and responsible use. Addressing these gaps early is important, as habits and understandings formed at this stage can influence later engagement.

Story-based instruction offers a practical way of supporting this early development. Narratives allow children to engage with ideas through familiar situations and characters, making it easier to understand and reflect on appropriate behaviour (Bruner, 1996). In digital citizenship education, stories can present everyday digital dilemmas in ways that are meaningful and accessible, helping pupils to connect principles with practice. This study draws on these ideas by examining digital citizenship as a form of crisis competence and exploring how it can be developed among primary school pupils through structured, story-based instruction. Focusing on selected private primary schools in Kwara State, Nigeria, the study assesses pupils' competencies in online safety, ethical behaviour, critical evaluation of information, and responsible participation, and evaluates the effect of the Click Smart intervention on these areas. In doing so, it highlights the role of early education in preparing individuals for responsible engagement with digital public services, particularly in situations where careful use of information is required.

Research questions

1. What is the level of digital citizenship competence among primary school pupils in Kwara State, Nigeria in terms of online safety awareness, ethical behaviour, critical evaluation of information, and responsible digital participation?
2. To what extent does the Click Smart story-based instructional intervention influence primary school pupils' digital citizenship competence?
3. Which dimensions of digital citizenship competence show significant improvement following exposure to the Click Smart intervention?
4. How do primary school pupils' digital citizenship competencies relate to their preparedness for engaging with digital public services in crisis situations?

Hypotheses

H₀1: There is no significant difference in pupils' digital citizenship competence before and after exposure to the Click Smart intervention.

H₀2: There is no significant difference in each dimension of digital citizenship competence (online safety awareness, ethical behaviour, critical evaluation, and responsible participation) before and after the intervention.

H₀3: There is no significant relationship between digital citizenship competence and crisis readiness among primary school pupils.

Literature Review

Digital Citizenship as Competence for Public Engagement

Digital citizenship has expanded from a narrow concern with safe technology use to a broader educational and civic construct. Earlier formulations emphasised appropriate behaviour and protection in online spaces (Ribble, 2015), but more recent work situates digital citizenship within democratic participation, critical thinking, and ethical engagement. This shift reflects a growing recognition that digital environments are not merely technical spaces but sites of civic interaction where judgement and responsibility shape outcomes.

Despite this expansion, much of the literature continues to treat digital citizenship as an educational outcome detached from governance systems. Studies often identify competencies such as ethical behaviour and critical evaluation but do not sufficiently explain how these competencies function when citizens interact with digital public services. This creates a gap between educational discourse and digital governance research. Positioning digital citizenship as a competence linked to public engagement addresses this limitation by recognising that participation in digital government requires more than access or technical skill.

Digital Government, Participation, and Trust

Research on digital government consistently highlights its potential to enhance participation, transparency, and accountability. Digital platforms create opportunities for citizens to engage in decision-making processes and access public information more directly (Benlahcene, 2024).

However, evidence shows that increased access does not automatically translate into meaningful participation. Recent studies indicate that while digital transformation can improve perceptions of government performance, actual civic engagement often remains modest, pointing to a gap between availability and use (Nurlinah et al., 2025).

Trust is central to this relationship. Empirical work demonstrates that trust in digital government is shaped by transparency, service quality, and prior interactions with institutions (Ndzabela et al., 2025). Yet findings remain mixed. Some studies report positive associations between e-government use and trust, while others show weak or inconsistent effects, suggesting that technological provision alone is insufficient (Lee-Geiller, 2024).

This body of work points to a key issue: digital government research tends to prioritise systems and institutions, with less attention given to the competencies required by users. Without these competencies, the potential of digital systems to support participation and trust remains uneven.

Digital Literacy and Information Behaviour

Digital literacy has been widely recognised as an important factor shaping engagement with e-government systems. It influences not only access but also the ability to evaluate information and participate in digital processes. Recent studies show that digital literacy moderates the relationship between perceptions of e-government effectiveness and trust, strengthening the likelihood of meaningful engagement (Lee-Geiller, 2024).

However, digital literacy alone does not fully capture the range of capabilities required in complex information environments. Information behaviour research demonstrates that individuals' engagement with information varies according to situation, urgency, and perceived risk (Case & Given, 2016). In high-risk situations, such as crises, the consequences of information use become more significant, and the ability to assess credibility becomes critical.

Digital environments intensify these challenges by increasing both the volume of information and exposure to misinformation. While digital systems provide access, users must still interpret and evaluate content. This suggests that competencies associated with digital citizenship, particularly critical evaluation and ethical judgement, extend beyond basic literacy and are necessary for effective engagement.

Instructional Approaches to Digital Citizenship Education

Within education, there is increasing recognition that digital citizenship requires structured and context-sensitive teaching. Evidence suggests that learners often acquire operational skills through exposure but lack deeper understanding of ethical and evaluative dimensions. This has led to growing interest in pedagogical approaches that emphasise engagement and reflection rather than rule-based instruction.

Interactive and scenario-based approaches have been shown to support deeper learning by allowing learners to explore consequences and develop judgement. Narrative approaches, in particular, have gained attention for their ability to translate abstract concepts into relatable situations. These approaches draw on educational theory, which highlights the role of narrative in supporting cognitive and moral development (Bruner, 1996).

Despite these advances, empirical work remains limited. Much of the literature focuses on measuring levels of digital citizenship rather than examining how specific instructional strategies influence outcomes, especially among younger learners. There is a need for more intervention-based studies that demonstrate how competencies can be developed in measurable ways.

Children as Emerging Digital Citizens

Children remain underrepresented in research on digital government and civic engagement. While they are increasingly exposed to digital technologies, they are rarely considered within frameworks of participation or trust. This omission is significant because early digital experiences shape later patterns of engagement.

Studies indicate that without structured guidance, children may struggle with issues such as misinformation, online safety, and ethical behaviour (Livingstone et al., 2017). At the same time, digital environments are becoming central to everyday life, meaning that children are already interacting with systems that influence how they understand information and authority.

Recognising children as emerging citizens shifts the focus from immediate system use to long-term competence development. It also aligns with recent calls for integrating education into digital governance strategies, where user capability is seen as essential to effective system use (Li & Zhang, 2025).

Synthesis and Research Gap

The literature highlights three main points. First, digital government can support participation and trust, but outcomes depend on how citizens engage with systems. Second, digital literacy plays an important role but does not fully address the ethical and evaluative demands of digital environments. Third, digital citizenship education offers a pathway for developing these competencies, yet its connection to digital public services remains weak.

What is missing is an integrated perspective that links early competence development with later engagement in digital public systems, particularly in high-risk situations. Existing studies rarely connect digital citizenship, information behaviour, and crisis within a single empirical frame.

examining how it can be developed through structured, story-based instruction among primary school pupils. This study addresses this gap by conceptualising digital citizenship as crisis competence and

Conceptual Framework

This study conceptualises digital citizenship as a form of crisis competence and examines how structured instruction can enhance pupils' preparedness for engaging with digital public services. The framework is built on three core elements. The first is the instructional intervention, operationalised through the use of Click Smart: Adventures in Digital Citizenship for Children. The second is digital citizenship competence, defined through four dimensions: online safety awareness, ethical digital behaviour, critical evaluation of information, and responsible digital participation. The third is crisis readiness, which reflects pupils' ability to interpret, evaluate, and act on digital information in situations requiring timely and responsible decision-making.

The framework assumes that exposure to structured, story-based instruction influences pupils' digital citizenship competence. Figure 1 shows the relationship that exists between the variables. Digital citizenship competence is expected to shape pupils' preparedness to engage with digital public services in crisis settings. This position is consistent with Digital Citizenship Theory, which emphasises responsible and informed digital participation (Ribble, 2015), and Social Cognitive Theory, which explains learning as a function of interaction between the individual, the environment, and observed behaviour (Bandura, 1977). It is further supported by information behaviour research, which highlights the role of evaluative and decision-making skills in high-risk information environments (Case & Given, 2016).

Theoretical Framework

This study draws on Digital Citizenship Theory, Social Cognitive Theory, and Information Behaviour research to explain how primary school pupils acquire competencies required for responsible engagement with digital environments, particularly in situations where digital systems mediate access to public services during crises. Rather than treating these perspectives independently, the study integrates them to account for both the formation and application of digital competence.

Digital Citizenship Theory provides the normative basis for the study. It defines the knowledge, skills, and values required for responsible participation in digital environments, including online safety, ethical behaviour, and critical engagement with information (Ribble, 2015). While the theory is commonly applied within educational settings, it is extended here to address situations where digital interaction carries higher stakes. In crisis conditions, individuals must interpret official information, assess credibility, and act in ways that support collective safety. The competencies outlined within digital citizenship thus operate not only as general behavioural expectations but also as practical requirements for engaging with digital public systems.

Social Cognitive Theory explains how these competencies are acquired. Bandura (1977) argues that learning occurs through observation, modelling, and reinforcement, with behaviour shaped by the interaction between personal factors and environmental influences. Within this study, story-based instruction functions as a structured learning environment in which pupils observe models of digital behaviour, reflect on consequences, and internalise appropriate responses. This process supports the development of self-efficacy, which influences pupils' confidence in evaluating information, managing risk, and acting responsibly in digital environments. The theory thus provides a mechanism linking instructional exposure to behavioural change.

Information Behaviour research situates these competencies within conditions of use. It emphasises that information seeking and use are shaped by specific purpose, urgency, and perceived risk (Case & Given, 2016). In crisis situations, these factors intensify, increasing the consequences of poor judgement and misinformation. Digital environments further complicate this process by expanding access while also amplifying uncertainty. From this perspective, competencies associated with digital citizenship, particularly critical evaluation and ethical judgement, are necessary for effective information use under pressure.

Thus, perspectives provide a coherent explanation of digital citizenship as crisis competence. Digital Citizenship Theory specifies the competencies required, Social Cognitive Theory explains how they are developed through guided learning, and Information Behaviour research clarifies how they are enacted in high-risk situations. The instructional intervention examined in this study operates at the intersection of these perspectives, serving as the mechanism through which pupils' competencies are shaped and linked to their preparedness for engaging with digital public services.

Methodology

Research Design

This study adopted a quasi-experimental design using a one-group pre-test and post-test approach. This design was considered appropriate for examining the effect of a structured instructional intervention on primary school pupils' digital citizenship competence. The absence of random assignment is consistent with school-based research where intact classes are often used. The design enabled the measurement of changes in pupils' competencies before and after exposure to a story-based digital citizenship programme using Click Smart: Adventures in Digital Citizenship for Children. The approach aligns with educational research that seeks to assess the effectiveness of instructional strategies in natural classroom settings (Creswell & Poth, 2018).

Population of the Study

The population comprised upper primary school pupils in private primary schools within Ilorin South Local Government Area of Kwara State, Nigeria. The focus on upper primary pupils (Primary 4 to Primary 6) was informed by their higher level of exposure to digital technologies and their ability to comprehend and respond to structured instructional content. Private schools were selected due to the availability of basic ICT facilities and the presence of a teacher designated to carry out library services, which supported the implementation of the instructional intervention.

Sample Size and Sampling Technique

A multi-stage sampling technique was employed. In the first stage, ten private primary schools within Ilorin South Local Government Area that possessed ICT facilities and library support were purposively selected. In the second stage, a sample of pupils was drawn from the selected schools using simple random sampling.

The sample size was determined using the Krejcie and Morgan (1970) table for sample size determination. For a population approaching 30,000, a sample size of 379 is considered adequate at a 95 percent confidence level and a 5 percent margin of error. Given that the population of upper primary pupils in the selected schools approximates this range, a sample size of 379 pupils was considered sufficient for this study. This size is also appropriate for detecting statistically significant differences in pre-test and post-test measures.

Instrument for Data Collection

Data were collected using a structured questionnaire titled Digital Citizenship and Crisis Readiness Questionnaire (DCCRQ). The instrument was adapted from established digital citizenship constructs

(Ribble, 2015) and informed by themes embedded in Click Smart: Adventures in Digital Citizenship for Children.

The questionnaire was divided into two main sections. Section A collected demographic information such as age, class level, and prior exposure to digital devices. Section B measured digital citizenship competence across four dimensions:

1. Online safety awareness
2. Ethical digital behaviour
3. Critical evaluation of information
4. Responsible digital participation

Items were structured on a four-point Likert scale ranging from Strongly Agree to Strongly Disagree. The same instrument was administered before and after the intervention to assess changes in pupils' competencies.

Validity of the Instrument

The instrument was subjected to face and content validity. It was reviewed by five experts drawn from Library and Information Science, Educational Technology, Psychology, and ICT in Education. Their feedback ensured that the items were appropriate for the age group and adequately captured the constructs under investigation. Minor revisions were made to improve clarity and alignment with the study objectives. Given that the instrument was adapted from previously validated constructs, further validation procedures were not undertaken.

Reliability of the Instrument

The reliability of the instrument was established through internal consistency using Cronbach's alpha coefficient. A pilot study was conducted with a small group of pupils outside the study area. The overall reliability coefficient was found to be acceptable for educational research, with a value of 0.78. As the instrument was adapted from established scales and had demonstrated acceptable reliability, the coefficient obtained from the pilot study was retained for the main study.

Sample Size

A total of 379 questionnaires were administered and retrieved, representing a 100 percent response rate. All responses were found usable for analysis.

Procedure for the Intervention

The instructional intervention was based on Click Smart: Adventures in Digital Citizenship for Children and was delivered over a period of four weeks. The sessions were facilitated by the researcher with the support of the school librarian or the teacher responsible for library services.

Each session focused on key themes, including online safety, ethical behaviour, critical thinking, and responsible participation. Story-based activities, guided discussions, and practical examples were used to engage pupils. Pupils were encouraged to reflect on scenarios presented in the stories and to relate them to their own digital experiences. The instructional approach emphasised participation, reflection, and reinforcement of appropriate digital behaviours.

Method of Data Collection

Data collection was carried out in three stages. First, the pre-test questionnaire was administered to the pupils to establish baseline levels of digital citizenship competence. Second, the instructional intervention was implemented over four weeks. Third, the post-test questionnaire was administered using the same instrument to measure changes in pupils' competencies. The researcher worked closely with school authorities to ensure that the data collection process was conducted in an orderly and supportive environment. The purpose of the study was explained to the pupils, and confidentiality was assured.

Method of Data Analysis

Data were analysed using both descriptive and inferential statistics. Descriptive statistics, including frequency counts, percentages, means, and standard deviations, were used to summarise the data and describe the levels of digital citizenship competence among pupils.

Inferential statistics were employed to test the research questions and determine the effect of the intervention. A paired sample t-test was used to compare pre-test and post-test scores in order to assess whether there were significant differences in pupils' digital citizenship competencies following the intervention. This test is appropriate for measuring changes within the same group over time. In addition, mean score analysis was used to identify the dimensions of digital citizenship that showed the greatest improvement after the intervention. All analyses were conducted at a 0.05 level of significance.

Effect Size Estimation

Cohen's d was calculated to assess the magnitude of the intervention effect. The effect size for the difference between pre-test and post-test scores was 1.19, indicating a large effect (Cohen, 1988). This suggests that the Click Smart intervention had a substantial impact on pupils' digital citizenship competence.

Ethical Considerations and Informed Consent

Formal ethical approval was obtained from the University of Ilorin Ethical Review Committee with number: Protocol Identification Code: UERC/CIS/131 and UERC Approval Number: UERC/ASN/2026/3697. Permission to conduct the study was obtained from the participating schools and the Kwara State Ministry of Education and Human Resources was informed prior to commencement of the study. All procedures involving human participants were performed in accordance with relevant ethical guidelines and regulations and were consistent with the ethical principles of the Declaration of Helsinki and its subsequent amendments. Informed consent was sought from the parents or guardians of all participating pupils prior to data collection. Participation was voluntary, and participants were free to withdraw from the study at any time without penalty. No personally identifiable information was collected, and all responses were treated confidentially and used solely for research purposes.

Adaptation

Items were developed from digital citizenship constructs outlined by Ribble (2015) and aligned with narrative themes in Click Smart: Adventures in Digital Citizenship for Children, particularly online safety, respectful behaviour, and thoughtful sharing. The instrument was simplified to suit the cognitive level of primary school pupils while retaining the core dimensions of digital citizenship competence. The variables in this study were operationalised as follows. Digital citizenship competence was measured using twenty-four items covering four dimensions: online safety awareness (items 1–6), ethical digital behaviour (items 7–12), critical evaluation of information (items 13–18), and responsible digital participation (items 19–24). Scores for each dimension were obtained by summing the relevant items, while overall digital citizenship competence was computed as the aggregate of all twenty-four items. Crisis readiness was measured using six items (items 25–30), which assessed pupils' ability to respond appropriately to digital information in situations requiring caution, verification, and responsible action. Higher scores indicate greater readiness to engage with digital public services in crisis contexts.

Results

Research Question 1

What is the level of digital citizenship competence among primary school pupils in Kwara State, Nigeria?

Table 1
Mean and Standard Deviation of Digital Citizenship Competence (Pre-test)

Dimension	N	Mean	SD	Interpretation
Online Safety Awareness	379	2.61	0.72	Moderate
Ethical Behaviour	379	2.74	0.68	Moderate
Critical Evaluation	379	2.43	0.75	Low
Responsible Participation	379	2.69	0.70	Moderate
Grand Mean	379	2.62	0.71	Moderate
Source: Researchers' field data (2026)				

Decision Rule

1. 1.00–1.99 = Low
2. 2.00–2.99 = Moderate
3. 3.00–4.00 = High

The findings show that pupils generally demonstrated a moderate level of digital citizenship competence before the intervention. Critical evaluation recorded the lowest mean score, indicating weaknesses in pupils' ability to assess the credibility of information.

Research Question 2

To what extent does the Click Smart intervention influence digital citizenship competence?

Table 2
Paired Sample t-test of Pre-test and Post-test Scores (Overall Competence)

Variable	Mean	SD	t-value	df	Sig. (p)
Pre-test	2.62	0.71			
Post-test	3.38	0.56	18.72	378	0.000
Source: Researchers' field data (2026)					
The post-test mean score is higher than the pre-test mean score. The p-value is less than 0.05, indicating a statistically significant difference. This shows that the Click Smart intervention significantly improved pupils' digital citizenship competence. Cohen's d was calculated to assess the magnitude of the difference, yielding a value of $d = 1.19$, indicating a large effect (Cohen, 1988)."					

Research Question 3

Which dimensions of digital citizenship competence show significant improvement?

Table 3
Paired Sample t-test by Dimension

Dimension	Pre-test Mean	Post-test Mean	Mean Difference	t-value	Sig. (p)
Online Safety	2.61	3.45	0.84	16.32	0.000
Ethical Behaviour	2.74	3.51	0.77	15.08	0.000
Critical Evaluation	2.43	3.22	0.79	17.54	0.000
Responsible Participation	2.69	3.33	0.64	14.26	0.000
Source: Researchers' field data (2026)					

All four dimensions recorded significant improvement after the intervention. Online safety awareness showed the highest improvement, while responsible participation recorded the lowest increase. Critical evaluation also showed substantial improvement, though it remained comparatively lower than other dimensions.

Research Question 4

How do digital citizenship competencies relate to crisis readiness?

Table 4
Pearson Correlation between Digital Citizenship and Crisis Readiness

Variables	N	r	Sig. (p)
Digital Citizenship Competence	379	0.68	0.000
Crisis Readiness	379		
Source: Researchers' field data (2026)			

There is a strong positive relationship between digital citizenship competence and crisis readiness ($r = 0.68$). The relationship is statistically significant at the 0.05 level. This indicates that pupils with higher digital citizenship competence are more likely to demonstrate readiness to engage with digital public services in crisis situations.

Summary of Findings

1. Primary school pupils exhibited moderate digital citizenship competence prior to the intervention, with weaknesses in critical evaluation.
2. The Click Smart story-based intervention significantly improved overall digital citizenship competence.

3. All dimensions of digital citizenship competence showed significant improvement, particularly online safety and critical evaluation.
4. Digital citizenship competence is strongly associated with pupils' crisis readiness, indicating that early digital citizenship education contributes to preparedness for engagement with digital public services.

Discussion

This study examined digital citizenship as a form of crisis competence among primary school pupils and assessed the effect of a story-based instructional intervention using Click Smart: Adventures in Digital Citizenship for Children. The findings contribute to ongoing debates on digital government, information behaviour, and digital citizenship education by foregrounding early-stage competencies that underpin future engagement with public digital services. The discussion is organised around the major findings and their theoretical and practical implications.

The first finding shows that pupils demonstrated a moderate level of digital citizenship competence prior to the intervention, with notable weaknesses in critical evaluation of information, as shown in Table 1. This pattern is consistent with existing research, which suggests that children often acquire operational digital skills through exposure but lack the evaluative and ethical capacities required for responsible engagement (Livingstone et al., 2017). The relative weakness in critical evaluation is particularly important in crisis-driven digital environments, where individuals must assess the credibility of information quickly and accurately. Information behaviour research has shown that under conditions of uncertainty, individuals tend to rely on heuristics and familiar sources, which can increase vulnerability to misinformation (Case & Given, 2016). For young learners, whose cognitive and reflective capacities are still developing, this risk is even more pronounced. The finding suggests that exposure to digital technologies alone does not translate into meaningful competence, reinforcing the need for structured educational interventions.

The second finding indicates that the Click Smart intervention significantly improved pupils' overall digital citizenship competence. This is clearly depicted in Table 2. This supports the argument that digital citizenship is not an innate outcome of technology use but a learned competence that can be developed through guided instruction. Ribble (2015) emphasises that responsible digital behaviour requires deliberate teaching that integrates knowledge, skills, and values. The improvement observed in this study aligns with educational research that highlights the effectiveness of structured programmes in shaping learners' digital practices. More specifically, the use of story-based instruction appears to have facilitated engagement and comprehension among pupils. Narrative approaches enable learners to connect abstract principles with concrete situations, thereby supporting deeper understanding and internalisation of values. This aligns with Bruner's (1996) view that narrative structures play a central role in cognitive development by allowing learners to interpret experiences and construct meaning.

Table 3, which shows Research Question 3, shows that all dimensions of digital citizenship competence improved significantly, with the greatest gains observed in online safety awareness and critical evaluation. The improvement in online safety is expected, as safety messages are often concrete and easily understood by children. However, the substantial gain in critical evaluation is particularly noteworthy, given its initial low baseline. This suggests that guided learning, when properly structured, can enhance higher-order thinking skills among primary school pupils. Research on media and information literacy supports this position, indicating that critical evaluation skills can be developed through exposure to guided questioning, reflection, and discussion (UNESCO, 2021). The relatively lower improvement in responsible participation may reflect the complexity of behavioural change, which often requires sustained reinforcement over time. While pupils may understand appropriate behaviours, translating this understanding into consistent practice may require longer-term engagement beyond the duration of the intervention.

The fourth finding reveals a strong positive relationship between digital citizenship competence and crisis readiness, as shown in Table 4. This provides empirical support for the central argument of the study, which conceptualises digital citizenship as a form of crisis competence. In crisis situations, individuals are required to engage with digital platforms to access information, follow instructions, and communicate effectively. These tasks demand not only technical access but also the ability to evaluate information, act ethically, and make informed decisions. The observed relationship suggests that pupils who possess higher levels of digital citizenship competence are better positioned to navigate such environments. This finding extends existing work in digital government, which often assumes a competent user base, by highlighting the developmental origins of such competence. It also aligns with studies on digital inequality, which emphasise that differences in skills and literacy, rather than access alone, shape individuals' ability to benefit from digital services (van Dijk, 2020).

From a theoretical perspective, the findings support the integration of Digital Citizenship Theory, Social Cognitive Theory, and Information Behaviour research. The observed improvements following the intervention are consistent with Social Cognitive Theory, which posits that learning occurs through observation, modelling, and reinforcement (Bandura, 1977). The Click Smart stories provided models of behaviour that pupils could observe and reflect upon, while guided discussions reinforced appropriate responses. The role of self-efficacy is also relevant, as pupils who gain confidence in their ability to navigate digital environments are more likely to engage responsibly. At the same time, Information Behaviour research provides a lens for understanding how these competencies are enacted in practice, particularly in situations where information use carries significant consequences. The study demonstrates that digital citizenship competencies are not only normative ideals but also practical skills that shape how individuals interact with information in real life.

The study also has implications for the design of digital public services. Current approaches to digital government often prioritise system efficiency, accessibility, and scalability, with limited attention to the competencies of users. The findings suggest that effective engagement with digital public services depends on citizens' ability to interpret and act on information responsibly. This is particularly important

in crisis settings, where misinformation and misinterpretation can have serious consequences. Integrating digital citizenship education into broader digital transformation strategies may help to address this gap. Such integration requires collaboration between educational institutions, information professionals, and policy makers to ensure that citizens are equipped with the skills needed for meaningful participation.

In Nigeria, the findings highlight the role of schools and libraries as critical sites for developing digital competence. School libraries, in particular, are well positioned to provide structured learning environments that support both information literacy and ethical engagement. Jaeger and Bertot (2011) argue that information institutions play a central role in supporting equitable access to digital resources and in promoting informed citizenship. Extending this role to include digital citizenship education can strengthen the contribution of libraries to public digital transformation. The use of age-appropriate, narrative-based resources further enhances this potential by making complex concepts accessible to younger learners.

This study makes three main contributions. First, it introduces primary school pupils as emerging participants in digital public service ecosystems, thereby extending the focus of digital government research beyond adult users. Second, it demonstrates that digital citizenship can be conceptualised as crisis competence, linking educational practices with broader societal needs. Third, it provides empirical evidence that story-based instructional approaches can effectively develop the competencies required for responsible digital engagement. These contributions respond to calls for interdisciplinary research that connects Information Systems with education, information science, and social practice.

While the findings are promising, they also point to the need for sustained and context-sensitive interventions. Digital citizenship is not a one-time achievement but a continuous process that evolves with technological and social changes. Future research may explore longitudinal effects of such interventions and examine how competencies developed in early education influence later engagement with digital public services. It may also consider the role of parents and community structures in reinforcing these competencies outside the school environment.

Overall, the study underscores the importance of preparing citizens not only to access digital systems but also to engage with them responsibly. In a period where crises increasingly rely on digital infrastructures, early investment in digital citizenship education can support more effective and ethical participation in digital societies.

Recommendations

The findings point to the need for a structured and early integration of digital citizenship education within primary school curricula. Education authorities should embed digital citizenship as a core component of basic education, with emphasis on online safety, ethical behaviour, and critical evaluation of information.

Such integration should move beyond occasional sensitisation programmes and be incorporated into formal teaching and learning activities across subjects.

School libraries should be strengthened as centres for digital citizenship instruction. Librarians and teachers responsible for library services should be trained to deliver guided, age-appropriate instruction using narrative and activity-based approaches. Story-based resources, such as Click Smart: Adventures in Digital Citizenship for Children, should be systematically used to support pupils' understanding of responsible digital behaviour. This approach aligns with evidence that structured and guided learning improves digital competence among young learners (Ribble, 2015).

Policy makers should recognise that effective digital government depends not only on infrastructure but also on citizen competence. Digital transformation strategies should incorporate educational components that prepare citizens from an early stage to engage responsibly with digital systems, particularly in crisis situations. Collaboration between ministries of education, communication, and information agencies would support the development of coordinated programmes that link digital literacy with public service engagement.

There is also a need to involve parents and caregivers in digital citizenship education. Given that children's digital practices extend beyond the school environment, parental guidance plays an important role in reinforcing responsible behaviour. Awareness programmes and simple guidelines can support parents in guiding children's digital activities, particularly in relation to information sharing and online safety.

Conclusion

This study examined digital citizenship as a form of crisis competence among primary school pupils in Kwara State, Nigeria and assessed the effectiveness of a story-based instructional intervention. The findings show that while pupils possess basic digital skills, there are gaps in critical evaluation and ethical decision-making. These gaps are significant where digital technologies are used to communicate and deliver services during crises.

The results demonstrate that structured, story-based instruction can significantly improve pupils' digital citizenship competencies. The use of narrative-based learning provided an effective means of engaging pupils and supporting their understanding of complex digital concepts. Importantly, the study establishes a strong relationship between digital citizenship competence and crisis readiness, indicating that early education plays a role in preparing individuals for responsible engagement with digital public services.

By positioning primary school pupils as emerging citizens, the study extends discussions on digital government beyond adult users and highlights the importance of early competence development. It also shows that educational institutions, particularly school libraries, can contribute to broader societal goals by preparing learners for participation in digital environments. The study reinforces the view that digital

transformation is not solely a technical process but also a social and educational one, requiring investment in human capabilities alongside technological systems.

Limitations of the Study

This study was designed to provide focused and context-specific insights into digital citizenship development among primary school pupils. The use of a quasi-experimental design within intact school settings ensured that the intervention was implemented under realistic conditions, thereby enhancing the practical relevance of the findings. However, the absence of a control group means that the observed changes cannot be attributed exclusively to the intervention without considering possible external influences.

The study was conducted within selected private primary schools in Ilorin South Local Government Area, where ICT facilities and library support were available. This allowed for effective implementation of the instructional programme and ensured that participants had some level of exposure to digital technologies. At the same time, this may differ from public schools or rural settings where access to digital resources is more limited. The findings should therefore be interpreted as reflecting conditions where basic infrastructure and instructional support are present.

The duration of the intervention was sufficient to observe measurable changes in pupils' competencies, particularly in knowledge and awareness. Behavioural change, especially in areas such as responsible participation, may require longer periods of reinforcement. The study provides evidence of immediate impact, while also indicating the value of sustained engagement for long-term outcomes.

Areas for Future Research

Future research may build on this study by employing more rigorous experimental designs that include control groups, allowing for stronger causal inference. Comparative studies across different school types, including public and rural schools, would provide a broader understanding of the factors that influence digital citizenship development.

Longitudinal studies are also needed to examine how digital citizenship competencies developed at the primary level influence behaviour over time. Such studies could track learners as they progress through different educational stages to assess the persistence and evolution of these competencies.

Further work may explore the role of parental mediation and home environments in shaping children's digital practices. Integrating school-based and home-based interventions would provide a more complete picture of how digital citizenship is developed and sustained.

There is also scope to examine how digital citizenship education can be adapted to specific crisis scenarios, such as health emergencies or security situations. This would strengthen the connection between educational practices and real-world applications of digital public services.

Finally, interdisciplinary research that links Information Systems, Library and Information Science, and education can deepen understanding of how user competence influences the effectiveness of digital government initiatives. Such work would contribute to a more integrated approach to digital transformation, where technological development is matched by investment in human capabilities.

Implications of the study

The study offers implications at several levels. Theoretically, it extends digital citizenship by presenting it as crisis competence. While much of the existing literature focuses on everyday digital behaviour, this study shows that the same competencies underpin responsible engagement in high-risk situations. It also brings together digital citizenship and information behaviour research, demonstrating how evaluative and ethical skills shape interactions with digital information when decisions carry greater consequences.

In practical terms, the findings support the use of structured, story-based approaches in teaching digital citizenship to young learners. Narrative resources such as Click Smart help pupils relate abstract ideas to familiar situations, making it easier to understand and apply responsible digital practices. The results also highlight the role of school libraries and educators in providing guided learning experiences that support both knowledge and behaviour.

At the policy level, the findings suggest that digital transformation efforts should include attention to citizen competence. The effectiveness of digital public services depends not only on system design but also on the ability of users to interpret and act on information appropriately. Integrating digital citizenship education into basic education can contribute to more effective and inclusive digital service delivery.

Positioning within Information Systems Research

This study contributes to Information Systems research by focusing on user competence as a crucial factor in the effectiveness of digital public services. Much of the literature on digital government has concentrated on infrastructure, system design, and institutional arrangements, often assuming that users are able to engage effectively with digital platforms. In practice, differences in digital skills and judgement can shape how individuals access and use these services.

By examining primary school pupils as emerging citizens, this study draws attention to the early development of these competencies. It shows that digital citizenship skills, developed through structured instruction, are linked to readiness for engaging with digital public services, particularly in situations where information must be interpreted carefully. This supports a more user-centred approach to digital transformation, where attention is given not only to systems but also to the capabilities of those who use them (Mergel et al., 2019).

Declarations

Statement of Contribution

This study makes three contributions. First, it presents digital citizenship as a form of crisis competence, linking educational practice with the demands of digital public service engagement. Second, it brings primary school pupils into discussions of digital government by treating them as emerging users whose competencies are still being shaped. Third, it provides empirical evidence that story-based instruction can improve digital citizenship competencies, offering a practical approach for early intervention.

AI Disclosure Statement

Portions of this manuscript were supported by the use of an artificial intelligence tool to improve grammar and for the creation of the infographic image. All intellectual content, interpretations, and conclusions are the responsibility of the authors.

Funding Declaration

No funding was received for this study

Competing Interests

The authors declare that they have no competing interests.

Data Availability

The datasets generated and analysed during the current study are not publicly available due to the age of the participants and institutional considerations but are available from the corresponding author on reasonable request.

Clinical trial number

Not applicable

Consent for Publication

Not applicable

Ethics Approval and Consent to Participate

Formal ethical approval was obtained from the University of Ilorin Ethical Review Committee with number: Protocol Identification Code: UERC/CIS/131 and UERC Approval Number: UERC/ASN/2026/3697. Permission to conduct the study was obtained from the participating schools and the Kwara State Ministry of Education and Human Resources was informed prior to commencement of the study. All procedures involving human participants were performed in accordance with relevant ethical guidelines and regulations and were consistent with the ethical principles of the Declaration of Helsinki and its subsequent amendments. Informed consent was sought from the parents or guardians

of all participating pupils prior to data collection. Participation was voluntary, and participants were free to withdraw from the study at any time without penalty. No personally identifiable information was collected, and all responses were treated confidentially and used solely for research purposes.

Author Contributions

A.O.D.: Conceptualisation, methodology, investigation, writing original draft, formal analysis.

S.V.A.: Supervision, validation, review and editing.

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Figures

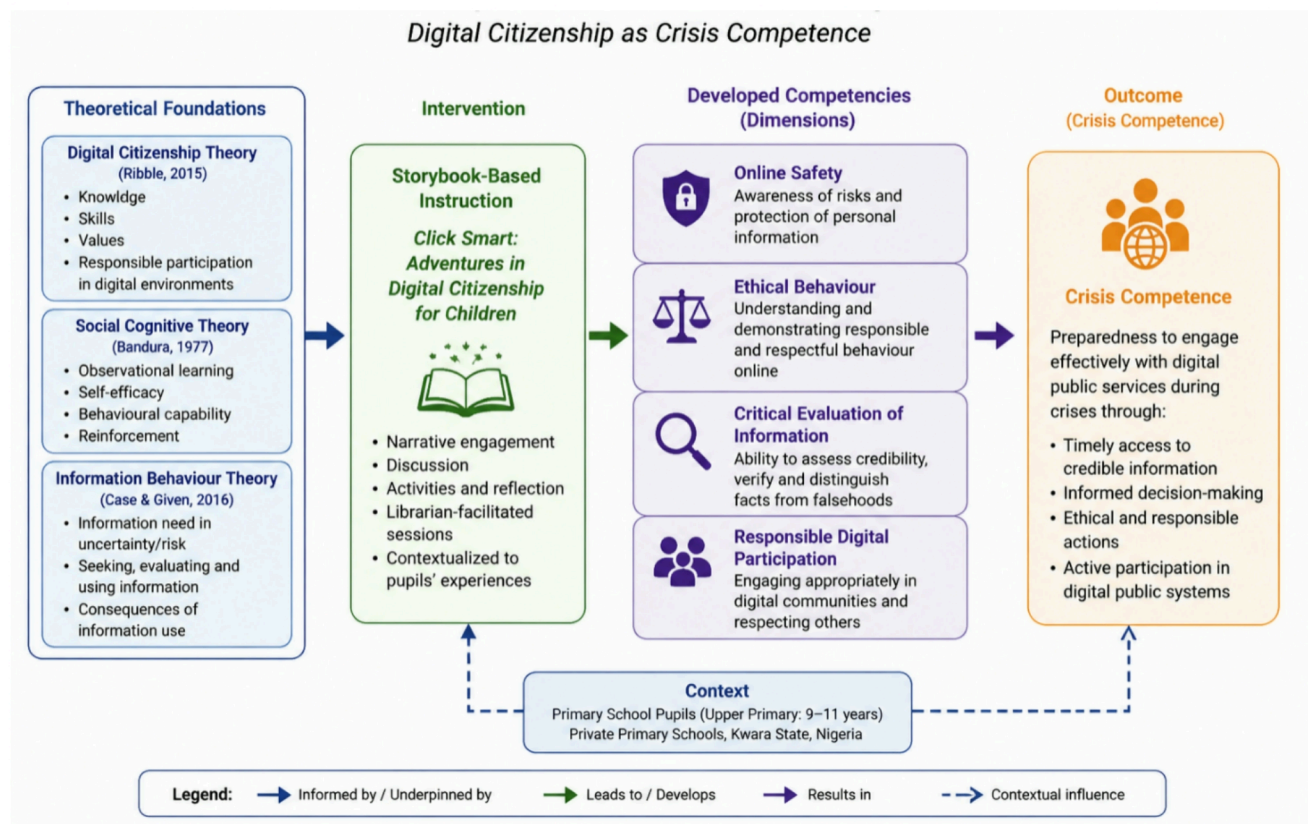


Figure 1

Supplementary Files

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- [APPENDIX.docx](#)