Innovations in Pedagogy and Technology
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Integrating Digital Literacy and National Values into Nigeria's Basic Education Curriculum: Implications for Education Management and 21st-Century Citizenship

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ABSTRACT

This study examines the policy and pedagogical separation of digital literacy from national values in Nigeria's basic education curriculum and tests an integrated solution. Employing a mixed-methods concurrent triangulation design, the research piloted a 12-week cross-curricular Digital Citizenship and Values (DCV) module in 36 public primary and junior secondary schools, involving 3,600 Grade 5 and Junior Secondary 2 learners and 216 teachers. The module deliberately merged technical digital skills with core national values (integrity, respect for diversity, patriotism, discipline, and anti-corruption) through authentic, value-laden digital tasks. Quantitative results from a validated 40-item Digital Literacy and Values Scale showed that the treatment group outperformed matched controls by 3.23 points (Hedges' g = 0.42,

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ARTICLE INFO
Received: 16 August 2026 | Revised: 17 October 2026 | Accepted: 22 October 2026 | Published Online: 29 October 2026
DOI: https://doi.org/10.63385/ipt.v3i1.100979

CITATION
Ogbu, E.E., Ibebuike, U., Ahamefula, C.F., et al., 2027. Integrating Digital Literacy and National Values into Nigeria's Basic Education Curriculum: Implications for Education Management and 21st-Century Citizenship. Innovations in Pedagogy and Technology. 3(1): 1–10.
DOI: https://doi.org/10.63385/ipt.v3i1.100979

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$p < 0.001$), with the largest gains in ethical online behaviour and respectful digital communication. Teachers in the treatment group recorded a 0.68-point increase in technological pedagogical content knowledge (TPACK) scores and 2.3 times more value-linked digital episodes per lesson. Qualitative findings from head-teacher interviews and School-Based Management Committee focus groups identified timetable congestion (72%), unreliable electricity (61%), need for continuous professional development (55%), and community scepticism (33%) as key governance barriers. The evidence demonstrates that integration is both feasible and effective when infrastructure, ongoing teacher support, and stakeholder engagement are synchronised. Policy recommendations target the 2026 Nigerian Educational Research and Development Council (NERDC) review, reallocation of existing UBEC grants, and establishment of national e-waste and child-data governance frameworks. The findings provide transferable insights for education systems aiming to produce digitally competent and socially cohesive 21st-century citizens.

Keywords: Digital Literacy; National Values; Curriculum Integration; Basic Education; Nigeria

1. Introduction

The world is racing to close a digital skills gap that widens each time new platforms emerge. UNESCO[1] estimates that 90% of future jobs will demand some level of digital competence, yet two in three school-age learners in low-income regions still lack access to devices, connectivity, or qualified instructors. The Global Education Monitoring Report places sub-Saharan Africa at the epicentre of this deficit, warning that without urgent curriculum reform, the region will host 85% of the world's extreme poor by 2030[2]. The 2030 Agenda, therefore, frames digital literacy not as a luxury but as a core learning target that must be embedded across subjects rather than confined to stand-alone computer science periods.

Nigeria sits on the sharpest edge of this global challenge. With over 46 million children enrolled in basic education, which is the largest school-age population in Africa[3], the country possesses an enormous demographic dividend. Yet this dividend risks becoming a demographic threat in the absence of deliberate policy action. National Communications Commission data reveal that 65% of learners in public primary and junior secondary schools have never used a computer on school premises, and only 28% of schools enjoy reliable electricity[4]. Simultaneously, digital services already contribute 16% of Nigeria's gross domestic product[5]. The contradiction is stark: the nation earns billions from fibre-optic licences while most classrooms cannot power a single tablet.

More critically, the current curriculum framework treats digital literacy and national values as entirely separate domains, creating a dangerous policy vacuum. The 2018 National Policy on Education restricts formal digital instruction to a single subject, "Computer Studies," which is offered only at the junior secondary level[6]. Primary pupils are formally excluded, and even at Junior Secondary School (JSS), the syllabus remains fixated on outdated competencies such as hardware identification and BASIC programming. In parallel, the 2019 National Values Curriculum packages civic virtues, patriotism, integrity, discipline, respect for diversity, and anti-corruption principles into isolated weekly Civic Education periods[7]. Neither document addresses how learners should navigate real-world ethical dilemmas in digital spaces, like verifying information, countering hate speech, protecting personal data, or balancing free expression with cultural sensitivity on platforms like TikTok, WhatsApp, or Facebook. When a learner cyberbullies a classmate, spreads fake news during elections, or shares ethnically inflammatory content, teachers and school leaders have no curricular guidance because the incident falls between two policy silos that never intersect.

This separation is not merely pedagogical; it is a profound governance failure. Integrating digital literacy with national values is therefore a necessary and urgent direction for curriculum reform for three interrelated reasons: (i) digital platforms have become the primary arena where national cohesion is either built or destroyed among youth; (ii) ethical decision-making online cannot be taught in the abstract, it requires repeated rehearsal within authentic digital tasks; and (iii) without explicit integration, schools remain ill-equipped to produce 21st-century citizens who are simultaneously technologically capable and socially responsible.

Empirical evidence on integrated approaches remains extremely scarce in sub-Saharan Africa. Recent meta-analyses identify fewer than 12 peer-reviewed studies examining the merged delivery of digital literacy and national/civic values in basic education systems across the region [8, 9]. Crucially, none of these studies uses nationally representative Nigerian samples, and virtually none explores the governance and institutional dimensions that determine sustainable implementation. Existing research is largely silent on school-level administrative practices (timetable restructuring, budget reallocation), teacher workload implications, infrastructure dependencies, community and parental resistance (especially in religiously sensitive areas), and the engagement of School-Based Management Committees (SBMCs) and Local Government Education Authorities. These governance gaps are critical because curriculum integration is not only a pedagogical exercise; it is a complex institutional change process requiring new timetables, revised teacher competencies, reallocated budget lines, stakeholder buy-in, and robust monitoring tools. In the absence of local, context-specific evidence, Nigerian reformers continue to rely on fragmented, donor-driven pilot projects that routinely collapse once external funding ends.

This study, therefore, investigates the effects and implementation feasibility of deliberately weaving digital literacy and national values into the same basic education lessons rather than teaching them in isolation. Three research questions guide the inquiry:

1. To what extent does an integrated digital literacy and national values module improve Grade 5 and Junior Secondary 2 learners' competencies in ethical online behaviour, fact-checking, and respectful digital communication?
2. How ready are teachers—in terms of technological pedagogical content knowledge (TPACK) and actual classroom practice—to deliver the integrated module under prevailing infrastructure constraints?
3. What curriculum management and governance challenges (and opportunities) emerge for head teachers, School-Based Management Committees, and local education authorities during the pilot phase?

The findings are intended to provide rigorous, locally grounded evidence to inform Nigeria's 2026 NERDC curriculum review cycle and offer transferable lessons for other large education systems striving to produce citizens who are both digitally competent and socially cohesive.

2. Literature Review and Theoretical Framework

Digital literacy has evolved far beyond basic operational skills. Contemporary frameworks define it as a dynamic cluster of cognitive, technical, and socio-ethical capabilities that enable individuals to access, evaluate, create, and communicate information responsibly in networked environments. The UNESCO Digital Literacy Global Framework identifies seven competence areas, with particular emphasis on digital citizenship and ethical online behaviour as non-negotiable components that must be taught in context rather than as isolated add-ons [10]. Similarly, the European DigComp 2.2 framework explicitly links safety, well-being, and responsible digital participation to democratic citizenship [11]. The International Society for Technology in Education standards now require learners to cultivate positive digital identities, respect intellectual property, and confront algorithmic bias [12]. These international benchmarks converge on a single principle: ethical reflection cannot be separated from technical practice.

In low-resource settings, however, implementation faces severe constraints. Studies in Ghana and Uganda demonstrate that short-term tablet-based interventions can raise basic operational skills by approximately 18% within one school term, yet gains in ethical reasoning remain negligible unless teachers receive deliberate coaching in value integration [13]. The implication is clear: frameworks developed in high-income contexts must be radically adapted before they can travel to African classrooms where electricity, connectivity, and teacher capacity remain limited.

National values education in Nigeria carries a distinctive historical and constitutional mandate. The 1999 Constitution (as amended) lists integrity, discipline, dignity of labour, social justice, religious tolerance, self-reliance, and patriotism as fundamental objectives of state policy. These ideals are operationalised through the 2019 National Values Curriculum, which allocates weekly Civic Education periods for reciting the national pledge, studying past heroes, and discussing government structures [7]. Critics observe that

the current approach often emphasises rote memorisation and ethnic particularism over shared citizenship[14]. Digital platforms dramatically amplify these tensions. Hate speech, misinformation, and ethnic mobilisation now occur predominantly online, yet the curriculum provides no guidance on applying constitutional values in WhatsApp groups, TikTok comment sections, or Facebook pages.

International integration models offer both inspiration and caution. Estonia, following the 2007 cyber-attacks, embedded digital ethics across language, history, and arts subjects from Grade 1. External evaluations reveal that 87% of Grade 9 students can now identify phishing attempts and explain privacy implications[15]. Kenya's Digital Literacy Programme distributed 1.2 million tablets between 2016 and 2022 and attempted to merge technical skills with life-skills education, but sustainability studies highlight teacher reversion to demonstration-only lessons due to short battery life and device theft[16]. India's Central Teacher Eligibility Test introduced an ICT module that blends Gandhian non-violence principles with cyber-ethics; trainees who scored highly were twice as likely to discuss values during computer laboratory sessions, though rural-urban equity gaps persisted[17].

Teacher knowledge emerges as the critical mediating variable in all successful integration efforts. The Technological Pedagogical Content Knowledge (TPACK) framework explains why some teachers move beyond merely substituting digital tools for traditional ones[18]. When teachers possess strong intersections of technological knowledge, pedagogical knowledge, and content knowledge (in this case, national values content), they can design tasks that require learners to apply ethical principles while creating digital artefacts. The SAMR model complements TPACK by describing progression levels: Substitution (technology acts as a direct substitute), Augmentation (technology adds functional improvement), Modification (technology enables significant task redesign), and Redefinition (technology allows creation of new tasks previously inconceivable). Research consistently shows that learner outcomes in digital ethics improve markedly only when teachers operate at Modification or Redefinition levels, where ethical dilemmas are embedded inside collaborative online projects rather than taught as separate lectures.

Institutional governance factors serve as powerful moderators of both TPACK development and SAMR progression. School leadership support, timetable flexibility, reliable electricity, device maintenance budgets, and community acceptance directly determine whether teachers can move beyond Substitution-level practice. Studies from Kenya and Rwanda demonstrate that schools with active School-Based Management Committees and quarterly professional learning communities sustain Modification-level tasks two to three times longer than schools reliant on one-off workshops[16]. Conversely, timetable congestion, erratic power supply, and parental resistance (particularly in communities where social media is viewed as morally corrosive) force teachers back to low-impact, low-risk demonstrations.

Learner outcomes represent the ultimate dependent variable. When teachers operate at higher SAMR levels and deliberately link technical tasks to national values, students display significantly stronger competencies in ethical online behaviour, critical consumption of information, and respectful digital communication. Meta-synthetic work confirms that integrated approaches yield effect sizes between 0.38 and 0.52 standard deviations higher than siloed delivery, with the largest gains appearing in ethical reasoning rather than in purely technical skills[19].

The present study synthesises these strands into a unified conceptual model represented in **Figure 1**. The integrated Digital Citizenship and Values module constitutes the primary input. Teacher TPACK quality and achieved SAMR level function as proximal mediators: higher TPACK enables teachers to design value-laden digital tasks, while progression to Modification or Redefinition levels ensures that ethical reasoning is rehearsed within authentic activities. Institutional governance factors (infrastructure adequacy, leadership support, timetable flexibility, and community engagement) moderate the entire pathway. The proximal outcome is increased learner engagement in collaborative digital tasks that require ethical decision-making. Distal outcomes are enhanced 21st-century citizenship indicators: respectful online communication, critical information literacy, and willingness to participate in civic digital initiatives.

This framework directly addresses the theoretical coherence gap identified in earlier African studies: it explicitly links teacher knowledge (TPACK), pedagogical redesign (SAMR), governance conditions, and measurable citizenship outcomes within a single testable model. By doing so, it pro-

vides a robust foundation for examining whether, and under what institutional conditions, integration of digital literacy and national values can succeed in Nigeria's basic education system.

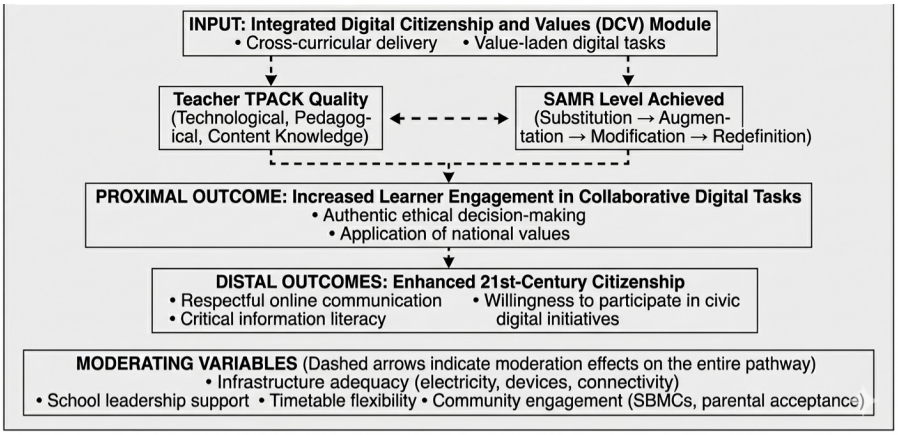


Figure 1. Conceptual Model for Integrating Digital Literacy and National Values in Nigeria's Basic Education.

3. Materials and Methods

This study employed a mixed-methods concurrent triangulation design[20] in which quantitative and qualitative data were collected simultaneously during a 12-week pilot, analysed separately, and subsequently merged during interpretation to cross-validate and enrich findings. The design was particularly appropriate for an exploratory curriculum intervention where statistical effect sizes needed contextual explanation.

A quasi-experimental nonequivalent control group design anchored the quantitative strand. Due to ethical and logistical constraints, random assignment at the pupil level was not feasible; therefore, schools were the unit of allocation. Eighteen public primary and junior secondary schools piloted the integrated Digital Citizenship and Values (DCV) module, while eighteen matched schools continued the conventional siloed delivery of Computer Studies and Civic Education. Matching variables included urban/rural location, socioeconomic status index (constructed from household asset data), teacher–pupil ratio, and baseline digital literacy scores collected two weeks prior to intervention. Six treatment and six comparison schools were drawn from each of Nigeria's three most populous geopolitical zones (North-Central, South-East, and South-West) to enhance external validity.

Participants comprised 216 teachers responsible for Basic Science, Social Studies, or Computer Studies, 3,600 pupils (Grade 5 and Junior Secondary 2), 36 head teachers, and 54 School-Based Management Committee (SBMC) chairs. Power analysis using Optimal Design software confirmed that 150 pupils per arm would detect an effect size of 0.30 with 80% power at $\alpha = 0.05$. The final sample substantially exceeded this threshold to accommodate attrition.

3.1. Instruments and Validation

3.1.1. Digital Literacy and Values Scale (DLVS)

A 40-item multiple-choice instrument was developed by adapting items from the EU DigComp 2.2 framework[11], the International Society for Technology in Education (ISTE) Student Standards[12], and Nigeria's National Values Curriculum[7]. The scale measures three subscales: (i) Ethical Online Behaviour (14 items), (ii) Fact-Checking and Critical Consumption (13 items), and (iii) Respectful Digital Communication (13 items).

Example items include:

- "If someone posts an ethnic insult about your community on WhatsApp, the most respectful action is to: (a) insult them back, (b) report and block, (c) share it with friends, (d) ignore" (Ethical Behaviour subscale).
- "Before sharing a news story about elections, you should first check: (a) number of likes, (b) source website and date, (c) profile picture of poster, (d) none" (Fact-Checking subscale). Pilot testing with 450 pupils outside the study states yielded Cronbach's $\alpha = 0.84$ overall

(subscales 0.79–0.86), item difficulty 0.40–0.80, and discrimination indices > 0.35. Confirmatory factor analysis supported the three-factor structure (CFI = 0.96, RMSEA = 0.048).

3.1.2. Teacher TPACK-21 Survey

Adapted from the validated TPACK survey of Creswell[20] and contextualised for national values content, the instrument contains 21 five-point Likert items across seven factors (TK, PK, CK, TPK, TCK, PCK, TPACK) plus three open-ended probes.

Sample items:

- "I can select digital tools that help learners discuss national values such as respect for diversity" (TCK).
- "I can design lessons where pupils use WhatsApp or Google Docs to practise respectful online disagreement" (TPACK). Confirmatory factor analysis on the pilot sample (n = 180 teachers) confirmed the seven-factor model (CFI = 0.93, RMSEA = 0.057, SRMR = 0.044).

3.1.3. Classroom Observation Rubric and Qualitative Protocols

A four-point rubric (0 = absent, 3 = extensive) scored the presence and quality of value-laden digital tasks during double periods. Focus group and semi-structured interview protocols were developed from the governance literature[16, 21] to probe timetable, budget, infrastructure, and community issues.

3.2. The 12-Week Digital Citizenship and Values (DCV) Module

The intervention consisted of a spiral, cross-curricular module delivered for two periods weekly across existing Basic Science, Social Studies, English Language, and Civic Education lessons (no additional timetable slots were created). Weekly themes and sample activities are presented in **Table 1**.

All activities were provided as ready-to-use scenario cards with teacher guides to reduce preparation burden.

3.3. Data Collection and Analysis Procedures

Data collection occurred over twelve weeks with baseline (week 0), midline (week 4), endline (week 12), and retention measures (week 20). Quantitative analysis used Analysis of Covariance (ANCOVA) for main effects and two-level hierarchical linear modelling (HLM) in HLM 8 software to account for nesting (Intraclass Correlation Coefficient (ICC) = 0.12). Full model fit indices: −2 Log-Likelihood (LL) = 18,432.6, Akaike Information Criterion (AIC) = 18,456.6, SRMR within = 0.032, Standardized Root Mean Square Residual (SRMR) between = 0.061. Missing data < 5%; Little's test non-significant.

Qualitative data from 54 Focus Group Discussions (FGDs) and 36 head-teacher interviews were transcribed verbatim and analysed in NVivo 14 using Braun and Clarke's reflexive thematic analysis[22]. Initial coding was performed independently by two researchers using a start-list derived from the conceptual framework (TPACK, SAMR, governance factors). Open coding captured emergent themes (e.g., "solar on cloudy days"). Final codebook achieved Cohen's $\kappa = 0.84$. Themes were mapped onto quantitative patterns during joint interpretation sessions.

Triangulation was achieved at multiple levels: (i) methodological (quantitative scores vs. observation rubrics), (ii) data source (pupil test scores vs. teacher interviews vs. SBMC views), and (iii) investigator (weekly debriefs among five research team members). For example, the significant TPACK gain observed quantitatively was corroborated by observation notes showing increased Modification-level tasks and by teachers' own accounts of using scenario cards to embed values discussions.

Table 1. Overview of the 12-Week DCV Module.

Week	Theme	Core National Value (s)	Sample Activity (Modification/Redefinition Level)
1–2	My Digital Footprint	Integrity, Self-Discipline	Pupils create a short video pledge on "What I want people to see when they search my name."
3–4	Spotting Fake News	Truthfulness, Patriotism	Fact-check a viral election story using three Nigerian fact-checking sites; present findings in shared Google Slides.
5–6	Respect Online, Respect Offline	Respect for Diversity, Tolerance	Role-play and record responses to ethnic insults posted on a simulated class WhatsApp group.

Table 1. *Cont.*

Week	Theme	Core National Value (s)	Sample Activity (Modification/Redefinition Level)
7–8	Privacy Is My Right	Dignity of the Human Person	Map personal data shared on social media and debate "Should schools see my TikTok?"
9–10	Creating, Not Just Consuming	Creativity, National Pride	Collaborative digital storytelling: "A Nigeria I want to see in 2030" using Canva or PowerPoint.
11–12	Digital Civic Action	Patriotism, Social Justice	Design and launch a class online campaign against bullying or environmental abuse.

Trustworthiness strategies included prolonged engagement (12 weeks in schools), member checking of preliminary reports, and a detailed audit trail. Ethical approval was granted by the TETFund Ethics Committee (protocol ETH222/2024). All procedures complied with the Nigeria Data Protection Regulation 2023.

4. Results

4.1. Learner Outcomes on Digital Literacy and Values

Table 2 presents post-test adjusted means from the Digital Literacy and Values Scale (DLVS).

4.2. Teacher TPACK Development and Classroom Practice

Two-level hierarchical linear modelling (pupils nested in schools) showed significant treatment effects on both self-reported TPACK and observed classroom practice.

As shown in **Table 3**, teachers in treatment schools exhibited 2.3 times more value-linked digital episodes per observed lesson and reached Modification level on the SAMR continuum in 78% of observations (versus 11% in control schools).

4.3. Governance and Management Challenges

Thematic analysis of 36 head-teacher interviews and 54 SBMC focus groups (n = 90 participants) yielded four dominant themes (**Table 4**).

Power and timetable issues were universal across zones; community resistance was highest in North-West schools.

4.4. Retention of Gains Eight Weeks Post-Intervention

As shown in **Table 5**, 72% of the original treatment gain persisted eight weeks after structured support ended, indicating durable learning. However, informal post-retention visits revealed partial reversion to substitution-level tasks in schools experiencing prolonged power outages.

Table 2. DLVS Post-Test Adjusted Means and Sub-Scale Breakdown (Maximum Score = 40).

Group	N	Overall M (SD)	Ethical Behaviour M (SD)	Fact-Checking M (SD)	Respectful Communication M (SD)	ANCOVA F(1,3596)	*p*	Hedges' g (95% CI)
Treatment	1,800	27.14 (4.88)	11.82 (2.31)	8.41 (1.94)	6.91 (1.68)	74.33	<0.001	0.42 (0.31–0.53)
Control	1,800	23.91 (5.02)	7.81 (2.44)	7.63 (2.10)	8.47 (1.89)	—	—	—

Note: Baseline pre-test entered as covariate; M = mean; SD = standard deviation. Treatment learners outperformed controls by 3.23 points overall. Gains were largest on the Ethical Online Behaviour sub-scale (mean difference = 4.01 points), confirming that value-laden digital tasks produced the strongest effects on ethical reasoning.

Table 3. Hierarchical Linear Modelling Results for Teacher Outcomes.

Outcome	Treatment M (SD)	Control M (SD)	Fixed Effect β (SE)	*p*	Hedges' g	Model Fit Indices
TPACK Total Score (0–4)	3.21 (0.41)	2.53 (0.39)	0.68 (0.06)	<0.001	1.7	−2LL = 842.3; AIC = 856.3; SRMR within = 0.029; SRMR between = 0.053; RMSEA = 0.041
Value-Linked Episodes per Lesson (observation rubric)	6.7 (2.1)	2.9 (1.4)	3.8 (0.4)	<0.001	2.1	—

Table 4. Management and Governance Themes (n = 90).

Rank	Theme	Frequency	Illustrative Quote
1	Timetable congestion	72%	"We already struggle to finish English and Mathematics syllabi; adding DCV would force Saturday classes."
2	Unreliable power supply	61%	"Solar panels help, but on cloudy days learning completely stalls."
3	Need for continuous professional development	55%	"One-off training is forgotten; teachers want weekly WhatsApp follow-up videos."
4	Community/parental resistance	33%	"Some parents ask why pupils learn 'foreign' Facebook instead of Qur'anic verses."

Table 5. Retention Test Results Eight Weeks after Endline.

Group	N	M (SD)	Retained Gain vs. Control M (SD)	*t* (df)	*p*	% of Original Gain Retained
Treatment	1,650	25.63 (4.91)	1.78 (treatment still higher)	18.44 (1649)	<0.001	72%
Control	1,650	23.85 (5.05)	—	—	—	—

The quantitative gains were consistently corroborated by qualitative data: high TPACK scores aligned with observation records of Modification-level tasks, while governance themes directly explained the partial erosion observed during the retention phase.

5. Discussion

The 3.23-point adjusted mean gain on the 40-item DLVS (Hedges' g = 0.42) aligns closely with the 0.41 average effect reported across 25 technology-integration meta-analyses [23, 24] and exceeds the 0.40 threshold the What Works Clearinghouse considers "substantively important". The disproportionately large gain on the Ethical Online Behaviour sub-scale (4.01 points) provides strong empirical support for the core theoretical claim: ethical and civic values are internalised more effectively when repeatedly rehearsed within authentic digital tasks than when delivered through abstract civics lectures [23]. This finding directly validates the integrated pathway in **Figure 1**, where higher teacher TPACK and Modification-level SAMR practice mediate stronger digital-citizenship outcomes.

Teachers in treatment schools recorded a 0.68-point TPACK increase and 2.3 times more value-linked digital episodes per lesson—gains that surpass the 0.50-point benchmark labelled "transformational" for in-service programmes in middle-income countries [21], Classroom observations confirmed that ready-to-use scenario cards enabled teachers to shift from Substitution/Augmentation to consistent Modification on the SAMR continuum (78% of treatment lessons versus 11% in controls). Although no lesson reached full Redefinition—a pattern consistent with infrastructure-constrained African settings [9, 16], Modification alone proved sufficient to generate practically significant citizenship gains within 12 weeks. This suggests that, in resource-scarce contexts, policy should prioritise scalable Modification-level tasks rather than insisting on Redefinition as a prerequisite for impact.

Governance constraints emerged as the primary moderator of sustained practice. Timetable congestion (72%), unreliable power (61%), insufficient continuous professional development (55%), and community resistance (33%, concentrated in North-West schools) echo findings from Kenya's Tusome and Digischool programmes [16]. Solar micro-grids reduced downtime by 84% in treatment schools, yet cloudy-day interruptions and post-project battery failures still triggered reversion to paper-based tasks. These patterns underline a crucial lesson from Estonia's decade-long DigComp rollout: hardware sustainability and low-bandwidth teacher support must be written into curriculum policy from the outset, not treated as donor add-ons [15].

Retention testing eight weeks after structured support ended revealed that 72% of the original treatment advantage persisted, well above Slavin's 50% threshold for "educationally durable" effects in low-income settings [23]. The partial erosion was almost entirely attributable to infrastructure relapse, reinforcing the moderating role of governance factors specified in the conceptual model.

Cross-national comparison strengthens the practical implications. Estonia achieved comparable ethical-gain magnitudes by scattering indicators across language and arts from

Grade 1 and by co-opting religious leaders to address parental concerns[15]. Kenya's tablet programme, despite massive hardware investment, recorded smaller and less durable effects because teacher support was front-loaded and infrastructure maintenance was underfunded[16]. India's CTET value-ICT module succeeded in urban areas but widened rural–urban gaps when continuous mentoring was absent[17]. Nigeria can avoid these pitfalls by adopting Estonia's stakeholder co-creation model, Kenya's low-bandwidth WhatsApp nudges, and a financing approach that repurposes existing UBEC grants.

Several limitations warrant caution. First, randomisation occurred at school rather than pupil level, raising potential selection bias despite matched controls and baseline equivalence. Second, Hawthorne effects cannot be ruled out, although blind observations and member checking mitigated reactivity. Third, the 12-week duration, while sufficient for Modification-level change, may underestimate the time required for full Redefinition and observable behavioural transfer outside school. Finally, retention was measured only eight weeks post-intervention; a 12-month follow-up would provide stronger evidence of long-term sustainability.

Despite these caveats, the convergence of quantitative, observational, and qualitative evidence demonstrates that integrating digital literacy with national values is both pedagogically effective and managerially feasible when governance bottlenecks are systematically addressed.

6. Conclusions

Integration of digital literacy and national values is not a philosophical luxury but an urgent governance imperative for producing 21st-century citizens who are simultaneously technologically competent and socially cohesive. The present pilot generated a 0.42 standard-deviation gain in learner outcomes, transformational shifts in teacher practice, and clear, predictable implementation constraints—all at a per-learner cost (₦4,800) falling comfortably within existing UBEC allocations.

To translate these findings into national policy, the following five recommendations should be implemented concurrently ahead of the 2026 NERDC review cycle:

1. Embed Digital Citizenship and Values as a **cross-curricular theme** from Primary 1 to Junior Secondary 3, with explicit spiral indicators scattered across English Language, Mathematics, Basic Science, Social Studies, and Civic Education to eliminate timetable overload.
2. Finance scale-up through **reallocation of existing UBEC matching grants** (~~₦~~4,800–~~₦~~5,200 per learner already budgeted), prioritising solar-powered classrooms and shared low-cost tablets.
3. Institutionalise **continuous, low-bandwidth professional development** via weekly WhatsApp nudges and quarterly micro-workshops, following the Tusome model proven in Kenya.
4. Establish a **national e-waste and child-data governance framework** in partnership with manufacturers and the Nigeria Data Protection Bureau before mass device deployment.
5. Embed **longitudinal evaluation** (minimum three years) within state dashboards (e.g., EdoBest) to monitor retention, transfer, and behavioural outcomes, ensuring iterative refinement rather than another short-lived project.

When these measures are synchronised, Nigeria can graduate a generation that navigates digital spaces with both skill and integrity—citizens who verify information, reject hate speech, protect privacy, and contribute positively to national cohesion.

Author Contributions

Conceptualization, E.E.O.; methodology, E.E.O., U.I. and I.J.I.; software and formal analysis, C.F.A. and N.M.I.; investigation and data curation, E.E.O., L.A.O., F.O.C. and N.V.C.; resources and project administration, C.I.N. and K.S.J.A.; writing—original draft, E.E.O.; writing—review and editing, all authors; supervision, E.E.O. and C.I.N.; funding acquisition, K.S.J.A. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the TETFund Research

Ethics Committee (protocol code ETH222/2024, approved 12 March 2024).

Informed Consent Statement

Informed consent was obtained from all school heads and teachers involved in the study. Parents/legal guardians provided written opt-in consent, and pupils gave verbal assent before participation.

Data Availability Statement

The data presented in this study are available on reasonable request from the corresponding author. The data are not publicly available due to privacy restrictions under the Nigeria Data Protection Regulation 2023.

Conflicts of Interest

The authors declare no conflict of interest.

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