

The Digital Bangladesh Paradox: Institutional Inertia and Symbolic ICT Adoption in Secondary Education

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ABSTRACT

This study critically investigates the status and challenges of Information and Communication Technology (ICT) integration in Bangladeshi secondary schools within the national Digital Bangladesh agenda. Employing a convergent mixed-methods design, it integrates quantitative survey data with qualitative focus group discussions and document analysis. Data were collected from 400 participants—teachers, head teachers, students, and education officers—across three divisions representing diverse socio-educational contexts. The analysis reveals a pattern of symbolic adoption manifested through three interrelated dynamics: weak translation of national ICT policy and limited instructional leadership; low teacher confidence and pedagogical competence in digital integration; and persistent inequities in infrastructure and access. These findings indicate that technological under-performance stems less from a shortage of equipment and more from institutional inertia, hierarchical school culture, and exam-driven pedagogical norms. The study argues that meaningful ICT integration requires systemic coherence—linking infrastructure investment with teacher empowerment, leadership development, and curricular reform. It concludes by recommending a whole-system strategy that foregrounds equity, sustained professional learning, and cultural transformation to achieve the inclusive and pedagogically purposeful vision of Digital Bangladesh.

Keywords: *ICT Integration; Digital Bangladesh; Symbolic Adoption; Teacher Agency; Institutional Inertia*

1. INTRODUCTION

Across the world, Information and Communication Technology (ICT) has redefined the grammar of education, shaping how knowledge is created, mediated, and circulated. It influences how learners participate in the knowledge economy and how teachers design inclusive and responsive pedagogies. Governments and international organisations increasingly recognise digital competence as a foundational element of twenty-first-century citizenship (UNESCO, 2018; OECD, 2021). ICT is no longer a supplementary tool but a catalyst for pedagogical transformation—enhancing learner autonomy, collaboration, and access to knowledge across

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social and spatial boundaries. Yet the diffusion of ICT remains profoundly uneven: while high-income nations have institutionalised digital learning ecosystems, many developing countries continue to face infrastructural, pedagogical, and cultural constraints that limit meaningful integration (Kozma, 2008; Milon, 2016; Al Nahar et al., 2024; Warschauer & Matuchniak, 2010).

For education systems in the Global South, ICT symbolises both promise and precarity. On one hand, it offers pathways toward achieving Sustainable Development Goal 4, which emphasises inclusive and equitable quality education and lifelong learning opportunities for all. On the other, it exposes persistent inequalities—scarce resources, limited teacher preparation, fragmented policy coordination, and socio-cultural resistance—that undermine educational justice (Unwin, 2009). South Asia epitomises this tension: mass expansion of schooling has coexisted with fragile infrastructures, rote-based pedagogies, and limited institutional capacity for innovation. These contradictions illustrate that digital reforms cannot be divorced from broader questions of governance, teacher professionalism, and resource distribution.

Bangladesh captures these complexities vividly. Since the launch of the Digital Bangladesh 2021 vision, the government has positioned ICT as a driver of human-capital development and good governance. National initiatives such as the National ICT Policy 2009 and the National Education Policy 2010 pledged to transform classrooms through multimedia resources, e-content, and digital management systems. Despite these commitments, implementation has remained fragmented and uneven. Research shows that ICT has been adopted more successfully in sectors like banking and public administration than in schools—the very institutions charged with cultivating digital literacy (Alam et al., 2018, 2021, 2025; Milon, 2016; Kabir & Ferdous, 2021).

Several structural and pedagogical factors explain this policy–practice gap. Many secondary schools own computers that are obsolete or kept locked to avoid misuse, while stable internet connectivity remains rare outside urban centres (Islam & Rahman, 2020). Teachers—already burdened by large classes and rigid syllabi—often view ICT integration as an added workload rather than a source of pedagogical renewal. The absence of operational guidance from the Ministry of Education and the Directorate of Secondary and Higher Education (DSHE) leaves school leaders uncertain about how to institutionalise digital strategies (Hossain, 2021). Consequently, ICT use tends to be limited to PowerPoint presentations or administrative record-keeping, reflecting what Selwyn (2016) describes as symbolic modernisation rather than substantive innovation.

Technological adoption, however, is not merely a technical process; it is deeply cultural and ideological. Technology mediates whose knowledge is legitimised, who gains visibility, and who remains marginalised. In Bangladesh, digital tools are often associated with urban elites and English-medium schooling, inadvertently alienating rural and Bangla-medium teachers and students. Such linguistic and socio-economic hierarchies reproduce digital inequities rather than dismantle them. Therefore, the critical question is not whether schools possess technology but how it reshapes pedagogical relationships, language practices, and institutional cultures (Buckingham, 2013; Selwyn, 2016).

Comparative experiences from other Southeast Asian systems show that effective ICT integration depends on systemic alignment among infrastructure, curriculum, assessment, and teacher professional learning. Malaysia's Smart School initiative and Singapore's ICT Masterplans demonstrate that successful reforms hinge on coherent leadership and long-term teacher development (Fullan, 2016). In contrast, Bangladesh's reforms have often been top-down and donor-driven, prioritising hardware procurement over pedagogical capacity. The assumption that access automatically leads to innovation ignores the realities of classrooms constrained by overcrowding, exam pressure, and limited autonomy. As a result, digital initiatives frequently reproduce existing inequalities, benefitting well-resourced urban schools while marginalising rural ones (BANBEIS, 2022; Rahman & Ahmed, 2019).

The COVID-19 pandemic further exposed the fragility of Bangladesh's digital infrastructure. When schools were closed, millions of students—particularly from low-income and rural households—were excluded from online learning due to the lack of devices, stable electricity, and affordable internet (UNICEF, 2021). Teachers, too, were unprepared for remote instruction, revealing systemic negligence of digital pedagogy in both pre-service and in-service training. This crisis underscored that digital literacy is not optional but essential for educational resilience and continuity during disruption.

Despite more than a decade of policy discourse, empirical research on ICT use in Bangladeshi secondary schools remains limited. Existing studies are often descriptive, focusing on the availability of hardware rather than the socio-cultural and institutional dynamics that shape practice. Little is known about how teachers, students, and administrators perceive, appropriate, or resist ICT in their daily routines. Moreover, the roles of leadership, management structures, and resource allocation in facilitating or constraining technology use have received minimal scholarly attention. These gaps highlight a pressing need for research that interrogates ICT integration as a complex, socially embedded process rather than a technical or policy exercise.

To address this gap, the present study adopts a critical mixed-methods approach to examine the current state of ICT integration in Bangladeshi secondary schools. It combines quantitative and qualitative evidence from multiple stakeholders—head teachers, assistant teachers, students, and education officers—to explore how ICT is perceived, practiced, and institutionalised within diverse school contexts. Beyond documenting access and usage, the study analyses the institutional and cultural logics that govern technology adoption, treating ICT as both a material and symbolic resource embedded in power relations, linguistic hierarchies, and ideological narratives.

Two guiding questions frame this investigation. First, in what ways do teachers, students, and administrators engage with ICT for teaching, learning, and school management, and what institutional and socio-cultural factors shape these engagements? Second, how might national policies be re-envisioned to bridge the division between technological availability and meaningful pedagogical transformation? Together, these questions steer the analysis toward both descriptive realities and normative possibilities—illuminating not only what exists but also what must be changed for ICT to foster inclusive and context-responsive education.

Ultimately, this study argues that understanding ICT integration requires moving beyond technocratic measures such as computer counts or connectivity rates. What matters is how teachers conceptualise technology’s pedagogical potential, how students experience digital learning, and how school leaders cultivate cultures of collaboration and innovation. By pointing out these dynamics within the broader vision of Digital Bangladesh, the study contributes to global debates on educational modernisation, technological justice, and sustainable reform in the Global South. Through this critical lens, it seeks to reveal the enduring disjuncture between policy promise and classroom practice and to propose actionable pathways for transforming digital aspirations into equitable educational realities.

2. LITERATURE REVIEW

2.1 Global and Comparative Perspectives on ICT Integration

Globally, Information and Communication Technology (ICT) has become a pivotal driver of educational reform, reshaping pedagogy, governance, and school administration. Research from high-income systems consistently shows that when meaningfully embedded in curriculum and teaching, ICT enhances learner engagement, teacher efficiency, and institutional transparency (Kozma, 2011; OECD, 2021). However, as Selwyn (2016) emphasises, technology in education is not neutral—it reflects and often reproduces the socio-economic and political structures within which it operates. Effective integration therefore depends not only on hardware provision but also on supportive ecosystems encompassing infrastructure, teacher capacity, and institutional culture.

Comparative research across developing regions highlights this complexity. Despite policy enthusiasm, implementation remains inconsistent. For example, Makewa et al. (2013) found that Kenyan schools used ICT mainly for record management rather than for interactive learning, while Amenyedzi et al. (2011) reported that Ghanaian teachers with computer literacy rarely incorporated technology pedagogically. Similar findings from Nigeria cite unreliable electricity, inadequate funding, and limited professional development as enduring constraints. Collectively, these studies illustrate an “implementation paradox”: governments recognise ICT’s potential but struggle to convert reform rhetoric into sustainable classroom practice.

2.2 ICT in the South Asian Context

Across South Asia, ICT has been framed as a symbol of national modernisation and competitiveness. Countries such as India, Pakistan, Sri Lanka, and Nepal have launched digital education programmes with support from international agencies (Asian Development Bank, 2020; UNESCO, 2018). Yet outcomes remain uneven. In India, Bhatnagar (2022) notes that the National Mission on Education through ICT expanded access but reinforced disparities between elite and government schools. In Pakistan, Mahmood et al. (2019) identifies donor-dependence and weak institutional continuity as recurring barriers, while Sri Lankan and Nepali reforms continue to suffer from inadequate teacher preparation and limited localisation of digital materials (Wijeratne, 2021).

These regional trends reveal a pattern of “technological modernisation” without pedagogical transformation (Unwin, 2019). Policies often privilege access to devices over capacity-building and context-sensitive pedagogy. Exam-driven curricula, centralised decision-making, and linguistic hierarchies further limit innovation. Thus, ICT reforms in South Asia tend to reproduce existing educational inequalities, making digital education both aspirational and exclusionary.

2.3 ICT Integration in Bangladesh: Policy, Practice, and Pedagogy

Bangladesh presents a particularly revealing case of the tension between ambition and inertia. Guided by the Digital Bangladesh 2021 vision, ICT has been promoted as central to education and national development. The National ICT Policy 2009 and National Education Policy 2010 envisioned a system-wide transformation through multimedia classrooms and teacher digital training. The Access to Information (a2i) programme introduced large-scale hardware provision and short-term workshops. However, evidence shows that these initiatives have achieved limited pedagogical change (BANBEIS, 2022).

Empirical studies consistently reveal a gap between policy rhetoric and classroom practice. Many schools possess non-functional or outdated equipment and lack reliable electricity and internet connectivity (Islam et al., 2020). Teachers often restrict ICT use to PowerPoint presentations, reflecting surface-level engagement (Kabir & Ferdous, 2021). Training remains largely technical, focusing on basic software skills rather than instructional design. Consequently, technology is perceived as an administrative tool rather than a medium for learner-centred pedagogy.

Institutional and cultural factors reinforce these limitations. Hossain (2021) highlights that headteachers, constrained by bureaucratic hierarchies and limited resources, rarely act as digital leaders. Furthermore, Bangladesh’s exam-oriented schooling culture discourages pedagogical experimentation (Begum & Alam, 2022). As a result, ICT integration tends to be symbolic—used to signal modernity rather than to transform learning (Selwyn, 2016).

The digital divide exacerbates these inequities. Urban students often have personal access to digital devices and internet connectivity, whereas rural learners depend solely on under-resourced school facilities. This reproduces socio-economic inequalities, consistent with global evidence of digital stratification (Warschauer & Matuchniak, 2010). During the COVID-19 pandemic, the consequences of this divide became severe: more than half of rural students were excluded from online learning due to lack of connectivity and devices (UNICEF, 2021). Teachers likewise struggled to adapt, revealing longstanding neglect of digital pedagogy in teacher education.

At the governance level, ICT projects in Bangladesh have frequently been short-term and donor-dependent. Following the initial success of the multimedia classroom project, maintenance and monitoring weakened, leading to “equipment without engagement”. This pattern reflects what Hamid and Honan (2012) describe as symbolic policy enactment, where technology becomes a political emblem of progress rather than an embedded educational practice. Although recent evaluations suggest improved administrative efficiency, pedagogical

transformation remains minimal without systematic mentoring and institutional leadership ((Milon et al., 2018a, 2018b; Rahman, 2023).

2.4 Teacher Competence, Leadership, and Institutional Culture

Teachers' competencies and institutional culture emerge as decisive factors in successful ICT adoption. The UNESCO ICT Competency Framework for Teachers (2018) outlines three developmental stages: technology literacy, knowledge deepening, and knowledge creation. Most Bangladeshi teachers remain at the foundational stage, using ICT mainly for presentation rather than for critical, interactive learning (Kabir & Ferdous, 2021). Training provided through the National Academy for Educational Management (NAEM) and Teachers' Training Colleges continues to prioritise technical rather than pedagogical skills, creating a mismatch between national policy expectations and teachers' practical capacities.

Leadership further mediates ICT integration. Fullan (2016) argues that educational reform depends on distributed leadership and collaborative school cultures. Yet Bangladeshi head teachers often lack both autonomy and training to champion innovation (Milon & Ali, 2023; Hossain, 2021). Institutional hierarchies, top-down accountability, and exam pressures constrain experimentation. These findings align with international literature indicating that ICT integration is fundamentally a social and organisational process shaped by trust, collaboration, and values, rather than by technology alone (Selwyn, 2021).

2.5 Theoretical Underpinnings

This study draws on two complementary frameworks: the Technology Acceptance Model (TAM) (Davis, 1989) and the Diffusion of Innovation (DOI) theory (Rogers, 2003). TAM explains how perceptions of usefulness and ease of use shape individuals' willingness to adopt technology. In education, it clarifies why teachers who value ICT may still hesitate to use it when institutional or technical barriers persist (Teo, 2020). DOI extends this perspective by including innovation within social and organisational networks, highlighting the role of leadership, communication, and contextual compatibility. Interpreted through a sociocultural lens (Selwyn, 2016), these models help explain how national ICT policies are enacted, negotiated, or resisted within schools.

2.6 Research Gap and Contribution

Despite growing attention to ICT in education, Bangladeshi research remains fragmented and predominantly descriptive. Most studies focus on infrastructure or access rather than on how teachers, students, and administrators engage with technology in everyday practice. Few adopt a multi-stakeholder lens that connects policy, pedagogy, and institutional culture. Moreover, socio-political dimensions—such as exam orientation, linguistic hierarchies, and rural–urban inequalities—are under-theorised. Addressing these gaps, the present study provides a critically informed mixed-methods analysis of ICT integration across secondary schools. By combining TAM and DOI within a sociocultural framework, it examines not only the extent of ICT use but also the institutional logics and power relations shaping it. The study contributes to regional scholarship by highlighting how leadership, teacher agency,

and organisational culture mediate digital reform in resource-constrained contexts, offering insights for building more equitable and sustainable ICT ecosystems in education.

3. METHODOLOGY

3.1 Research Design

This study adopted a convergent mixed-methods design to examine the status, practices, and challenges of ICT integration in Bangladeshi secondary schools. The design enabled the researcher to combine the quantitative breadth of descriptive trends with the qualitative depth of contextual interpretation (Creswell & Plano Clark, 2018; Milon et al., 2023). Quantitative data captured measurable dimensions of ICT access, competence, and use among teachers, head teachers, students, and education officers, while qualitative inquiry explored the cultural, institutional, and attitudinal dynamics underlying these patterns. The approach was theoretically grounded in the Technology Acceptance Model (Davis, 1989) and Diffusion of Innovation (DOI) theory (Rogers, 2003). TAM explains how perceived usefulness and ease of use shape adoption, whereas DOI includes adoption within communication networks and organisational norms. Interpreted through a critical sociocultural lens (Selwyn, 2016), these frameworks positioned ICT not as a neutral innovation but as a socially embedded practice shaped by institutional hierarchies, resource inequities, and teacher agency.

3.2 Participants and Sampling Strategy

The study was conducted in three divisions—Dhaka, Rajshahi, and Rangpur—purposively selected to represent urban, semi-urban, and peripheral contexts within Bangladesh’s secondary education system. To ensure schools possessed at least minimal ICT facilities, only A-grade secondary institutions (classified under the Integrated Supervision and Assessment System, 2013) were included. This focus allowed attention to be directed toward pedagogical and institutional barriers rather than complete infrastructural absence. A total of 400 participants contributed: 56 headteachers, 52 assistant teachers, 256 students, and 36 education officers. This multi-stakeholder composition reflected the interdependence of policy actors, educators, and learners in ICT implementation. Purposive sampling (Alam et al., 2024; Milon, 2020; Milon et al., 2017; Patton, 2015) was used to select “information-rich” cases—participants with at least one year’s professional engagement in secondary education and some exposure to ICT-related activities. The resulting dataset captured both vertical (policy–practice) and horizontal (teacher–student–administrator) variations in experience.

3.3 Data Collection Procedures

Data were collected between September and December 2023 through three complementary techniques: surveys, focus group discussions (FGDs), and document analysis.

The quantitative survey measured ICT infrastructure, user competence, and perceived barriers. Instruments were adapted from validated studies (Kabir & Ferdous, 2021; Teo, 2020) and refined through expert review and pilot testing for contextual fit. The final questionnaire combined closed-ended Likert items with a few open-ended prompts and was distributed in both

online and paper formats to accommodate uneven internet access. The qualitative component consisted of four FGDs, each comprising six to eight participants drawn from teachers, students, and education officers across the three divisions. Sessions were conducted in Bangla to ensure authentic expression and lasted about ninety minutes. Using a semi-structured guide, participants discussed perceptions of ICT usefulness, professional development experiences, classroom practices, and institutional challenges. All sessions were audio-recorded with consent. In addition, document analysis of key texts—including the National Education Policy (2010), National ICT Policy (2009), ICT in Education Master Plan (2019–2024), and school-level ICT plans—provided contextual understanding of how national intentions intersect with local realities. Triangulating these data strengthened validity by linking official discourse to live experience.

3.4 Data Analysis

Quantitative and qualitative data were analysed concurrently and integrated at the interpretation stage. Quantitative responses were coded and analysed using SPSS (Version 29). Descriptive statistics (frequencies, means, standard deviations) summarised patterns of access, training, and competence, while bivariate analyses explored relationships between teachers' ICT skills, professional development, and teaching experience.

Qualitative data were examined through Reflexive Thematic Analysis (RTA) (Braun & Clarke, 2019, 2021; Yasmin et al., 2024), which aligns with the study's interpretivist orientation. Transcripts were repeatedly read for familiarisation, and inductive coding was applied to identify recurring meanings. Codes were then collated into themes—such as symbolic implementation, teacher anxiety, and leadership vacuum—that captured both convergence and contradiction across participant groups. The process was recursive and reflexive, allowing theoretical constructs from TAM and DOI to inform but not predetermine analysis. Integration of both strands occurred during interpretation, where quantitative patterns were contextualised through qualitative insights to generate a coherent, critically grounded narrative of ICT use.

3.5 Ethical Considerations

The research followed internationally recognised principles of informed consent, confidentiality, and voluntary participation, adapted to the Bangladeshi context. Each participant received an information sheet detailing study objectives and rights, and written consent was obtained from all adults. For students under eighteen, parental or guardian consent, along with school approval, was secured. To preserve anonymity, pseudonyms (e.g., T1, S2, H3) replaced personal identifiers, and data were stored on encrypted, password-protected devices. FGDs were held in neutral spaces to reduce hierarchical influence and encourage open discussion. Ethical awareness was treated as a continuous, reflexive process rather than a procedural formality, guiding all interactions with participants.

3.6 Researcher Reflexivity

The researcher’s positionality—as an educator and scholar with long-term engagement in Bangladesh’s secondary education sector—created a dual insider–outsider status (Alam et al., 2022a, 2022b; Finlay, 2021). Insider familiarity facilitated access, rapport, and linguistic sensitivity, while the potential for interpretive bias required deliberate reflexive management. To maintain transparency, the researcher kept a reflective journal documenting methodological decisions and emotional responses, engaged in peer debriefing with academic colleagues, and revisited assumptions throughout analysis. This reflexive practice ensured that interpretation emerged from a dialogic interaction between data, theory, and researcher subjectivity, aligning with the study’s critical sociocultural orientation and enhancing trustworthiness.

4. FINDINGS

4.1 Overview

The mixed-methods analysis integrates survey results from 400 respondents with qualitative insights from focus group discussions (FGDs) and document analysis. Collectively, the data reveal a profound gap between national digital policy aspirations and classroom realities. Although the Digital Bangladesh agenda presents technology as a catalyst for educational reform, implementation at the school level remains sporadic and largely symbolic. Three interconnected themes emerged: (1) weak policy communication and leadership, (2) uneven ICT competence and limited pedagogical use, and (3) infrastructural and cultural barriers. These themes are discussed through the convergence of numerical evidence and participant narratives, interpreted through the Technology Acceptance Model (TAM), the Diffusion of Innovation (DOI) theory, and a sociocultural lens.

4.2 Policy and Leadership Gaps

Quantitative findings show a striking policy vacuum: 100 percent of head teachers and over three-quarters of teachers reported receiving no official ICT guidelines from the Ministry of Education or the Directorate of Secondary and Higher Education (DSHE), and 84 percent said their schools lacked written ICT plans. This absence of guidance was strongly echoed in qualitative accounts. A head teacher from Dhaka (H4) explained, “We hear about ICT policy in the news, but no document ever comes to school. We are told to ‘use computers’ without knowing what to do.” An education officer (EO2) added, “Our circulars mention ICT, but there is no monitoring. Everyone assumes someone else is responsible.”

These narratives exemplify what scholars describe as symbolic policy enactment—policy that is declared but not enacted. From a DOI perspective (Rogers, 2003), this represents a breakdown in the communication networks required for effective diffusion. Leadership capacity was also limited: most head teachers had no ICT-management training and expressed uncertainty about budgeting. One teacher (T8) observed, “The computer lab is locked because the headmaster fears damage; we cannot use it without permission.” Such hierarchical control stifles teacher agency and innovation. The absence of distributed leadership thus reflects not only administrative deficiency but also an ideological assumption that technology adoption will occur through compliance rather than collaboration.

4.3 ICT Competence and Pedagogical Use

The survey revealed marked disparities in digital competence. Seventy-one percent of head teachers and 68 percent of teachers rated their skills in PowerPoint, spreadsheets, and databases as poor or very poor, while nearly 60 percent of students reported good or very good basic computing ability—skills often acquired informally through mobile devices. FGDs deepened these insights. A teacher from Rajshahi (T5) admitted, “I can type documents, but using multimedia in class feels risky—if it fails, I lose my lesson.” Another (T11) noted, “There is no technician; when the projector stops, the class stops.” Students voiced frustration: “We want to use computers for projects,” said one (S6), “but teachers say there’s no time.”

These accounts reveal the classic TAM pattern (Davis, 1989): high perceived usefulness but low perceived ease of use. Teachers value ICT’s potential yet feel unprepared and unsupported. Fear of technical failure, coupled with exam-centred accountability, discourages experimentation. From a sociocultural perspective (Selwyn, 2016), such apprehension is institutional rather than personal—reinforced by isolation, limited peer collaboration, and an absence of professional learning communities. Bivariate analysis showed that teachers who had received any ICT-related training (29 percent) reported higher confidence, but even they rarely moved beyond presentation-based use. As one teacher (T9) reflected, “Training taught us how to click, not how to teach.” This supports Kabir and Ferdous’s (2021) critique that professional development in Bangladesh remains procedural rather than pedagogical.

4.4 Infrastructure and Access Inequalities

Infrastructure deficits emerged as another defining barrier. Only 52 percent of schools had a functioning computer lab, and 71 percent lacked sufficient multimedia facilities. Two-thirds of students (68.8 percent) reported never using the internet at school, while over 40 percent of head teachers relied on home or commercial internet. Participant accounts provided vivid context: a student from Rangpur (S4) said, “We see computers, but they’re covered with dust. Sometimes the lab stays locked for months.” A head teacher (H6) added, “When power cuts happen, we cancel ICT lessons.” Another teacher (T12) explained, “The internet bill is too high; we use our own phones instead.”

These experiences confirm BANBEIS (2022) data showing severe rural–urban disparities in infrastructure. From a DOI standpoint, Bangladesh exhibits two-speed diffusion: well-resourced urban schools progress faster, while peripheral schools stagnate. Kozma (2011) describes this as the infrastructure illusion, where the mere presence of equipment is mistaken for meaningful integration. Gendered inequities were also evident—female students and those from low-income households had the least digital access, reflecting broader patterns of educational stratification (Warschauer & Matuchniak, 2010). Thus, technology access mirrors, rather than mitigates, existing social hierarchies.

4.5 Institutional and Cultural Constraints

Beyond infrastructure, institutional culture profoundly shaped ICT practice. Many teachers regarded technology as an optional add-on. A teacher from Dhaka (T3) explained, “Our

priority is finishing the syllabus; ICT slows us down.” This sentiment illustrates the dominance of exam-oriented pedagogy that privileges syllabus completion over creative learning (Alam et al., 2024). Hierarchical school structures further inhibit innovation. Teachers frequently mentioned needing administrative permission to use equipment or modify lessons. As one teacher (T10) observed, “If the head doesn’t approve, the computers stay idle.” Conversely, head teachers cited pressure from district officials but no operational support—a pattern one education officer (EO1) called “responsibility without power.”

Such inertia epitomises what Selwyn (2016) terms decorative digitalisation—technology displayed for appearances rather than embedded in pedagogy. Students recognised this performance logic: “We use the lab only when visitors come,” said one (S8). Quantitative findings corroborate this: while 60 percent of teachers reported occasional ICT use, fewer than 15 percent used it weekly for lesson delivery. These cultural logics—bureaucracy, risk aversion, and lack of recognition for innovation—sustain low integration. In sociocultural terms, technology adoption becomes a moral rather than technical act, bounded by norms of hierarchy and caution rather than curiosity and collaboration.

4.6 Convergence of Quantitative and Qualitative Insights

Integrating both strands of data underscores that ICT integration in Bangladeshi secondary schools is partial, unequal, and symbolically maintained. Quantitative evidence depicts low competence, limited infrastructure, and minimal policy communication, while qualitative narratives expose the lived realities behind those numbers—uncertainty, fear, and institutional inertia. From a TAM perspective, teachers’ high perceived usefulness but low ease of use explain slow adoption; from a DOI perspective, the absence of leadership and communication networks constrains diffusion. Together, these frameworks reveal why ICT policies achieve visibility without vitality.

This synthesis exposes the central contradiction within Digital Bangladesh: policy discourse celebrates digital inclusion, yet practice reproduces exclusion through inequitable access and bureaucratic control. These findings echo Hamid and Honan’s (2012) argument that Bangladeshi educational reforms often follow a top-down logic that marginalises teacher and student agency. Ultimately, ICT integration is less constrained by technology than by institutional imagination. Teachers and students exhibit willingness and curiosity, yet the structures surrounding them limit participation. As one student concluded (S10), “Technology could make learning exciting—but here, it feels like it belongs to others, not to us.” This remark encapsulates the paradox of symbolic adoption: digital tools are present, but digital empowerment remains deferred.

5. DISCUSSION

The findings expose a central paradox within Bangladesh’s digital education reform: despite substantial investment and national rhetoric under the Digital Bangladesh agenda, ICT integration in secondary schools remains fragmented, superficial, and largely symbolic. This contradiction echoes a broader trend across the Global South, where the discourse of digital transformation frequently outpaces pedagogical realities (Unwin & Leach, 2020; Wambugu,

2020). What distinguishes the Bangladeshi context is the magnitude of the gap between national aspiration and everyday classroom practice.

5.1 Policy Disconnect and Symbolic Enactment

At the policy level, a near-total absence of communication between national frameworks and school implementation was evident. Although progressive documents—such as the National ICT Policy (2009), National Education Policy (2010), and ICT in Education Master Plan (2019–2024)—promise to embed technology throughout education, most head teachers and teachers reported receiving no operational guidance from the Directorate of Secondary and Higher Education. This disjuncture exemplifies what Kozma (2008) describes as symbolic policy enactment, wherein ICT functions more as a political emblem of progress than as a pedagogical tool. Bureaucratic, top-down communication structures preclude teacher participation in decision-making, eroding ownership of reform. As Selwyn (2016) warns, such technological solutionism treats digitalization as a hardware problem, neglecting the institutional, cultural, and ideological systems that perpetuate inequality. Consequently, policy declarations achieve visibility but lack vitality within schools.

5.2 Pedagogical Inertia and the TAM/DOI Gap

These policy weaknesses directly constrain teacher agency and pedagogical practice. Quantitative results revealed that most educators possess only basic digital literacy, consistent with earlier evidence that ICT training in Bangladesh prioritises technical rather than pedagogical competence (Kabir & Ferdous, 2021). Teachers’ accounts—“We can use the computer, but not for teaching” and “If the projector fails, the class fails”—reflect the anxiety produced by insufficient technical support and fear of lesson disruption. Within the Technology Acceptance Model (Davis, 1989), this anxiety manifests as a misalignment between perceived usefulness and perceived ease of use: teachers value ICT’s potential yet feel unable to implement it confidently. The highly exam-oriented culture further discourages innovation, as educators prioritise syllabus coverage and test outcomes over exploratory learning. Similar forms of pedagogical inertia, where technology reinforces rather than transforms traditional instruction, have been observed in neighbouring contexts such as Malaysia and India (Bhatnagar, 2022). The pattern underscores that technology adoption depends as much on pedagogical freedom as on technical access.

5.3 Infrastructural Fragility and Digital Stratification

The infrastructural constraints identified in the study exacerbate this pedagogical stagnation. Only half of the surveyed schools maintained functional computer laboratories, and nearly two-thirds of students had never accessed the internet at school. These disparities expose entrenched rural–urban inequalities and confirm BANBEIS (2022) data showing that ICT resources remain unevenly distributed. Kozma (2008) cautions that technology without systemic planning becomes an empty promise, while Rogers (2003) argues that innovations fail when incompatible with their environment. In Bangladesh, unreliable electricity, outdated hardware, and insufficient maintenance render digital tools aspirational rather than transformative. Moreover, inequities intersect with gender and class: female students and those

from low-income households reported markedly lower access to devices and connectivity. Such disparities reflect what Warschauer and Tate (2022) term digital stratification, whereby digital inequalities reproduce broader educational and social hierarchies. Hence, the challenge is not simply infrastructural but distributive and ethical.

5.4 Institutional Culture and Decorative Digitalisation

Beyond physical resources, institutional culture plays a decisive role in shaping ICT use. Many teachers viewed technology as an external imposition rather than an integral component of teaching. This attitude is reinforced by hierarchical governance structures that privilege control over collaboration. Teachers repeatedly noted that they required permission to access the computer lab or modify lesson plans, a dynamic that exemplifies what Selwyn (2016) calls decorative digitalisation—technology displayed to signify modernity but seldom integrated into pedagogy. Head teachers themselves often lacked the training or autonomy to act as digital leaders, confirming Hossain’s (2021) observation that leadership in Bangladeshi schools remains administrative rather than instructional. Consequently, both teachers and students occupy passive roles within a bureaucratic ecology that rewards compliance instead of creativity. Such institutional inertia transforms technology from a participatory medium into a performative artefact.

5.5 Towards Systemic Alignment

Taken together, these findings suggest that ICT integration in Bangladesh is not primarily a technological challenge but a systemic and socio cultural one. The weak diffusion of policy, constrained teacher agency, and exam-centred pedagogy collectively sustain a cycle of dependency and inertia. As Hamid and Honan (2012) argue, reform efforts that rely on top-down delivery without dialogic engagement rarely achieve sustainable change. A transformative approach requires aligning infrastructure with human capacity, policy with pedagogical reality, and innovation with equity. This alignment entails recognising that digital reform is a cultural process—dependent on meaning-making, collaboration, and institutional trust.

To move forward, teachers need empowerment beyond technical skills: opportunities to experiment, reflect, and contextualise digital pedagogy within their local realities. School leaders must evolve from bureaucratic overseers to instructional mentors who foster collective learning cultures. Policy frameworks, in turn, should prioritise iterative feedback, local adaptation, and teacher agency. Consistent with UNESCO (2018) and OECD (2021) recommendations, sustainable digital transformation demands a whole-system approach—treating technology as a means to inclusivity, creativity, and critical thinking rather than an end in itself. Without such systemic realignment, ICT in Bangladesh’s secondary education risks remaining a promise of modernity rather than a practice of transformation.

6. RECOMMENDATIONS

The study confirms that Bangladesh’s secondary education system continues to struggle to translate the Digital Bangladesh vision into classroom reality. ICT functions more as a

policy symbol than a pedagogical tool, constrained by fragmented governance, limited teacher agency, infrastructural inequity, and an exam-oriented culture. Addressing these interlocking challenges requires a coordinated strategy that aligns policy reform, leadership development, teacher capacity-building, infrastructural justice, and cultural transformation within a sustainable, context-sensitive framework.

6.1 Strengthening Policy Coherence and Leadership

Reform must begin at the policy and leadership level. The findings revealed a near-total absence of communication between national ICT policy frameworks and schools, leaving teachers without clear directives. The Ministry of Education and the Directorate of Secondary and Higher Education (DSHE) should therefore develop a comprehensive ICT-in-Education Implementation Framework that specifies institutional responsibilities, funding streams, and accountability mechanisms. Research demonstrates that policy diffusion succeeds when school leaders act as intermediaries between macro-level reforms and classroom practice (Fullan, 2016; Hossain, 2021). Building digital-leadership capacity among head teachers and education officers is thus essential. Training should extend beyond administrative compliance to include strategic planning, mentoring, and collaborative decision-making. Drawing on Rogers' (2003) Diffusion of Innovation theory, such leadership development can provide the communication bridge through which innovation becomes normalized rather than imposed.

6.2 Re-envisioning Teacher Professional Development

Teacher capacity remains the linchpin of meaningful ICT integration. Most teachers demonstrate basic technical literacy yet lack confidence for pedagogical use, reflecting short-term, tool-focused training. Professional learning must therefore become continuous, collaborative, and practice-oriented. Embedding digital pedagogy within pre-service Training curricula and sustaining in-service mentoring will help align training with classroom realities. Evidence from regional studies indicates that peer collaboration and mentoring enhance self-efficacy and reflective practice (Kabir & Ferdous, 2021; Teo, 2020). Crucially, teacher education should emphasise not only how to use technology but why—encouraging teachers to design lessons that promote interaction, inclusion, and learner autonomy. Consistent with the Technology Acceptance Model (Davis, 1989), training should enhance both perceived usefulness and ease of use by linking digital tools directly to pedagogical goals and assessment criteria.

6.3 Ensuring Infrastructural Equity and Sustainability

Infrastructure remains a prerequisite for equitable participation. Only half of the surveyed schools had functional computer labs, with rural institutions disproportionately disadvantaged. Resource allocation should therefore prioritise bridging these regional divides while sustaining existing facilities. This requires dedicated maintenance budgets, localized technical support, and reliable electricity. Shared ICT resource centres among neighbouring schools could maximise limited assets, while investment in renewable energy would improve consistency in peripheral regions. However, infrastructural expansion must serve pedagogical

rather than statistical objectives. Funding should support connectivity that enhances learning outcomes, not merely device counts (BANBEIS, 2022; Islam, 2020; Milon et al., 2024). In this sense, infrastructure policy must shift from procurement to purposeful utilisation grounded in instructional design.

6.4 Transforming School Culture and Pedagogy

Beyond policy and infrastructure, genuine reform depends on cultural change within schools. Teachers often view ICT as a bureaucratic demand rather than a pedagogical opportunity, a perception rooted in hierarchical governance and exam-driven curricula. To foster creativity and innovation, assessments and curricula must explicitly value digital literacy, collaboration, and problem-solving. School leaders should cultivate environments that reward experimentation, enabling teachers to take instructional risks without fear of sanction. Recognising and celebrating innovative teaching can gradually reposition technology as a means of exploration and inquiry rather than a display of modernity. This shift from compliance to curiosity requires re-defining professional success—not as adherence to directives but as reflective, student-centred engagement with technology.

6.5 Securing Long-Term Sustainability through Collaboration

Sustainable reform also demands renewed financing and cross-sector collaboration. The recurrent cycle of donor-driven or pilot-based projects should be replaced by locally owned, continuously funded initiatives. Increasing the national education budget for ICT—coupled with transparent utilisation and community monitoring—would enhance accountability. Public–private partnerships can mobilise technical expertise, as demonstrated in other South-Asian contexts where collaboration improved connectivity and teacher support (Bhatnagar, 2022). Nonetheless, such partnerships must remain guided by equity principles to prevent the commercialisation of digital education. Establishing national and regional forums for research–practice exchange can further ensure that innovation remains contextually grounded and ethically informed.

6.6 Building a Culturally Responsive Digital Ecosystem

Ultimately, the challenge is not to introduce more technology but to reimagine the ecosystem that enables its meaningful use. Effective ICT integration arises from the synergy of visionary leadership, empowered teachers, equitable infrastructure, and inclusive pedagogy. As Selwyn (2016) reminds us, technology in education is never neutral—it reflects whose knowledge counts and whose participation is valued. For Bangladesh, embracing this critical awareness is vital. Embedding ICT within inclusive, reflexive, and context-responsive practices can transform the Digital Bangladesh vision from rhetoric into reality, ensuring that digitalisation serves not merely as a sign of progress but as a practice of educational justice.

7. CONCLUSION

This study critically examined the state of Information and Communication Technology (ICT) integration in Bangladeshi secondary schools through a convergent mixed-methods

design, framed by the Technology Acceptance Model (Davis, 1989) and the Diffusion of Innovation theory (Rogers, 2003). The findings reveal a persistent and widening gap between the ambitious rhetoric of Digital Bangladesh and the realities of classroom practice. While national policy frameworks portray ICT as a transformative engine for educational development, school-level implementation remains fragmented and largely symbolic. Most institutions continue to face limited infrastructure, weak teacher competence, and inadequate leadership support. The absence of coherent operational communication from the Ministry of Education and the Directorate of Secondary and Higher Education (DSHE) has resulted in inconsistent and superficial adoption, with technology often serving as a token of progress rather than a catalyst for pedagogical change.

Viewed through the Technology Acceptance Model, teachers' generally positive attitudes toward ICT's usefulness are undermined by a low perceived ease of use. This gap reflects structural deficiencies—short, technical-only training; unreliable infrastructure; and minimal institutional support—that collectively discourage innovation. From the perspective of the Diffusion of Innovation theory, ICT adoption in Bangladesh remains stalled at an early diffusion stage, sustained by a few motivated individuals rather than embedded within institutional culture or supported by robust communication networks. Together, these findings exemplify what Selwyn (2016) characterises as symbolic modernisation: the appearance of technological progress without meaningful transformation in teaching and learning practices.

The study thus underscores that ICT integration is not merely a technical enterprise but a socio-institutional process deeply influenced by cultural hierarchies, policy inertia, and exam-driven pedagogies. Structural constraints and bureaucratic control restrict teacher agency, while the absence of distributed leadership limits collective innovation. For reform to be effective, Bangladesh's digital education strategy must prioritise systemic alignment—linking infrastructure, professional development, leadership, and assessment within a coherent and context-responsive framework. School leaders should be empowered as instructional mentors who foster experimentation and reflection, rather than serving solely as administrative managers. Likewise, teachers require ongoing, collaborative professional learning that explicitly connects digital tools with pedagogical goals. Equitable infrastructural investment, particularly in rural and government-aided schools, is essential to prevent ICT from reproducing existing inequalities.

Conceptually, this study contributes to the growing body of critical ICT-in-education scholarship by demonstrating the analytical value of combining TAM and DOI within a sociocultural framework. This integrated lens reveals that technology adoption in education is mediated not only by users' perceptions of utility or innovation but also by social meanings, institutional logics, and power relations. Effective ICT integration, therefore, depends on cultivating a digital culture that values creativity, collaboration, and critical engagement over compliance and performativity. Technology becomes transformative only when embedded within pedagogical relationships grounded in trust, agency, and reflexivity.

Nevertheless, the study acknowledges certain limitations. Its focus on A-grade schools in three divisions offers insights into relatively resource-advantaged contexts and may not fully capture the realities of under-resourced or remote institutions. Additionally, reliance on

self-reported data introduces the possibility of response bias, as participants may overstate competence or underreport challenges. Future research should adopt longitudinal and ethnographic approaches to explore how ICT practices evolve across diverse institutional and socio-economic settings. Studies focusing on gender, digital literacy, and linguistic inclusion would further illuminate the equity dimensions of Bangladesh's digital education landscape.

In closing, ICT integration in Bangladeshi secondary education remains an unfinished project—rich in national aspiration but constrained by systemic inertia. Technology alone cannot reform education without coherent policy, visionary leadership, and a supportive institutional culture. Bridging the divide between policy promise and classroom practice requires a paradigm shift from access-driven agendas to human-centred, pedagogically grounded approaches. Only through such alignment—where technology genuinely serves learning, inclusion, and empowerment—can the Digital Bangladesh vision evolve from symbolic aspiration into a sustainable model of transformative education for the twenty-first century.

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