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Original Article

E-Governance Implementation in the Education System: A Comparative Study in Bangladesh and Indonesia

Md. Hasan[1], Md. Sajal Miah[2], Hasibur Rahman[3], Parvez Simol[4], Md Saber Hossen[5], Abdullah[6], Mohammad Shaheen Alam[7], Tahamina Akter[8], Rajib Chandra Das[9*]

[1-4]Department of Public Administration, Comilla University, Cumilla-3506, Bangladesh
[5,8]Department of Anthropology, Comilla University, Cumilla-3506, Bangladesh
[6]Department of Mass Communication and Journalism, Comilla University, Cumilla-3506, Bangladesh
[7]Research Assistant of Research & Integrated Thoughts (RIT), Dhaka-1000, Bangladesh
[9]Public Administration, Department of Law, CCN University of Science & Technology, Kotbari, Cumilla-3503, Bangladesh
Email: [1)] mdhasancou97n@gmail.com, [2)] sajal17cou.ac.bd@gmail.com, [3)] rahmanhasibur982@gmail.com, [4)] parvezshimul.cou@gmail.com, [5)] mdsaberhossencou@gmail.com, [6)] abdullah.cou.mcj@gmail.com, [7)] shaheenalam.cou@gmail.com, [8)] tanniibnatafnan@gmail.com, [9)] rajibrajcou@gmail.com

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Abstract

The rapid advancement of ICT has transformed education governance worldwide. E-governance in education has emerged as an important tool for improving administrative efficiency, transparency, accessibility, and service delivery in developing countries. This study compares Bangladesh and Indonesian education e-governance experiences on institutional preparation, digital literacy, and stakeholder satisfaction. Digital media is being used more in education in both countries to boost efficiency. This report compares education system e-governance implementation in those nations. The goal is to analyze governance and compare the obstacles both countries confront in adopting and implementing e-government in education. This mixed-methods comparative case study analyses Bangladesh and Indonesia as parallel units. This architecture allows systematic evaluation of each country's e-government framework, digital infrastructure, and educational service delivery. The study uses only secondary data. The results showed that both countries struggle to adopt education e-governance. Bangladesh has weak infrastructure and little digital literacy, while Indonesia has stronger technology but regional differences and remote area opposition to digital transformation. This research has several practical implications for policymakers, educators, and stakeholders. The study reveals to policymakers the necessity of strategic planning, investment in digital infrastructure, and inclusive policies. These papers can also serve as a reference for enhancing digital governance in the education sector and eliminating the urban-rural digital gap. This paper recommends that it is extremely essential to overcome infrastructure issues and promote cost-effective technologies. So that they share some common issues, yet e-governance can help open up the education system, making it more accessible and efficient.

Keywords: Digital Governance, Digital Literacy, E-Governance, Education, ICT Integration.

1. Introduction

E-governance in education refers to the use of information and communication technology to improve the quality of education and service delivery, and to facilitate access to information and educational resources (Debbarma & Chinnadurai, 2024). E-governance or ICT provides a new dimension in the field of education. E-Governance serves as an important

tool for both students and teachers to find ways to make the topic more interesting and easier to understand through practical examples (Williams, 2023). Bangladesh aims to become a "Smart Bangladesh" by implementing digital tools across all sectors, including education. Unfortunately, the education sector in Bangladesh and Indonesia is underfunded. Last year, Bangladesh and Indonesia invested 1.52% and 1.3% of their GDP (TBS, 2024), while UNESCO recommends investing 4%-6 % in education. There are some challenges in implementing E-Government in education worldwide, such as Infrastructure Limitations, Digital Literacy Gap, Data Privacy and Security, and Resistance to Change. There are only 33,285 multimedia classrooms and 11,307 computer labs in Bangladesh (Al-Shboul et al., 2014).

According to the Bangladesh Bureau of Educational Information and Statistics, only 56% of institutions in Bangladesh have internet access. On the other hand, the government of Indonesia took steps to connect the internet to 0.3 million educational institutions by 2025 (Wicaksono, 2025), while it has 0.4 million schools, according to Statistics Indonesia. Therefore, more than one quarter (25%) of schools remain without internet access, depriving a significant proportion of students of digital learning opportunities. Several studies have examined e-governance systems in education worldwide. Estonia, South Korea, and Singapore provide successful examples of e-government integration in education. Estonia's e-education system offers digital transcripts, online learning resources, and school management tools accessible nationwide, promoting transparency and student-centered services. South Korea's EduTown platform connects students with digital learning and administrative services, fostering a smart education environment. Although several studies have explored E-government in education globally, comparative studies focusing on Bangladesh and Indonesia remain limited. This study aims to analyze the current status of e-governance implementation in the education sectors of Bangladesh and Indonesia, compare the major challenges faced by both countries, and assess the opportunities that e-governance provides for improving educational governance, transparency, and accessibility (Amaliah et al., 2025).

Effective integration of ICTs in the education sector helps improve teaching, learning, and research by increasing flexibility and providing a rich environment and motivation for teaching, thereby significantly impacting the learning process by introducing better opportunities for learners and teachers (Rama, 2022). E-governance improves teaching at universities by offering ICT integration many opportunities for instructors and students and by shifting the conventional teaching approach toward a more creative, student-centered model. However, there is little ICT integration in the classroom as compared to research and community outreach (Alenezi et al., 2023).

This study is important as it provides a comparative understanding of e-governance implementation in the education systems of Bangladesh and Indonesia, where such research remains limited. Also highlights the role of e-governance in improving educational quality, accessibility, transparency, and student-centered learning environments. E-governance in education refers to the use of information and communication technology (ICT) to improve educational quality, service delivery, and access to resources. It enhances teaching and learning by making content more engaging and easier to understand (Amaliah et al., 2025). Bangladesh aims to become a Smart Bangladesh by integrating digital tools into education. However, Bangladesh allocated 1.52% of their GDP (TBS, 2024) and Indonesia allocated 1.3% of their GDP, compared to UNESCO's recommended 4%-6%. Key challenges include infrastructure limitations, digital literacy gaps, and data security concerns. In Bangladesh, only 56% of institutions have internet access (BANBEIS, 2023). In Indonesia, despite initiatives to link institutions, a substantial segment remains without access. Countries such as Estonia and South Korea exemplify effective e-governance in education via digital platforms

and integrated system. Nonetheless, comparative analyses concerning Bangladesh and Indonesia are scarce. This study is to analyze the adoption of e-government in both nations, identify obstacles, and evaluate its impact on enhancing governance, transparency, and accessibility. The incorporation of ICT enhances teaching, learning, and research by fostering adaptable and student-centric environments (Williams, 2023). However, classroom-level implementation remains limited. This study is important as it provides a comparative perspective and highlights the role of e-governance in enhancing educational quality and access.

2. Literature Review

2.1. Concept of E-Governance:

Uddin (2012) defines e-governance as the implementation of specific methods and strategies to enhance the efficacy and efficiency of public administration through information and communication technology (ICT). This definition highlights the central role of digital tools in transforming traditional governance structures into more responsive and efficient systems. E-governance is not merely about digitizing services but also about improving administrative processes and decision-making mechanisms. The provision of government services through the use of information and communication technology (ICT) is referred to as e-governance. Öktem et al. (2014) provide a broader understanding of e-governance by highlighting its applications across multiple governmental functions, including policymaking, the legitimization of government applications, the auditing and accounting of government activities, the provision of government transparency and accountability, and service delivery.

Bhuiyan and Akter (2024) state that E-Government integrates digital communities with extensive documentation. For secure and prosperous e-governance, it is necessary to ensure information security and authorized access for particular communities. Hasan (2003) discusses the transformative potential of technological advancement in shaping governance and education systems. The caliber and capability of technology will perpetually advance to a level where it can provide virtually anything currently conceivable. Furthermore, technological advancements will make powerful computing tools accessible to nearly all individuals at reasonable cost. Beyond educational institutions, the utilization of information technology for educational and training purposes is anticipated to be prevalent.

2.2. E-Governance in Bangladesh's Education System

Hossen et al. (2025) highlight that the concept of "Digital Bangladesh" is becoming a highly relevant topic of daily conversation among Bangladeshi IT experts, reporters, legislators, students, and policy officials. Addison (2021) and Hasan (2003) argue that technological advancements are expected to significantly reshape the education sector. They suggest that ICT will become increasingly embedded in teaching and learning processes, making digital education tools more common both inside and outside the classroom. This transformation has the potential to improve access to education and enhance learning outcomes. Karmakar and Wahid (2000) identify e-learning as a promising area for development in Bangladesh. To successfully implement e-learning as a contemporary pedagogical approach in Bangladesh, it is essential to evaluate our preparedness both numerically and qualitatively. The primary components of e-governance are described as government, industry, education, and society. To achieve this, Bangladesh must emulate the trajectory established by leading e-governance-ready nations.

Notwithstanding these benefits, numerous hurdles impede the proper execution of e-governance inside Bangladesh's educational framework. Saxena (2005) argues that many e-governance initiatives fail because they focus too heavily on technological aspects rather than governance outcomes. The author asserts that successful e-governance must be governance-centric, prioritizing effectiveness and public benefit above mere efficiency. This necessitates a distinct emphasis on results and conformity with the tenets of effective governance. Addison (2021) further highlights the importance of technological literacy, noting that citizens must possess sufficient knowledge and skills to engage effectively with digital systems. The scholar further noted that to participate effectively in project designs and technology policy, the public needs technological literacy (Amin, 2024).

Persistent disparities in digital literacy highlight underlying socio-economic and cultural inequalities. For instance, rural internet penetration lags significantly behind that of urban areas, with only 47% of rural residents having regular internet access compared to 85% in urban settings. Aziz and Hossain (2024) point out that, while technological infrastructure is expanding, the pedagogical integration of digital tools in education remains inadequate. Pal and Sarker (2023), referencing an Access to Information (A2I) survey (2023), report that only a limited proportion of public schools in Bangladesh have functional computer laboratories. Furthermore, a very small percentage of teachers have received training in digital pedagogy. This lack of training limits the effective use of technology in classrooms and reduces the potential benefits of e-governance in education. Rogers (1998) reports that, in the context of Bangladesh, where teacher training in digital pedagogy remains limited, only 17% of teachers reportedly receive such training. TPACK emphasizes a key weakness in the current system that hinders meaningful technology integration in education. Similarly, Rogers' Diffusion of Innovations Theory explains how innovations spread, or fail to spread, through social systems, influenced by factors such as perceived usefulness, ease of use, social norms, and institutional support.

2.3. E-Governance in Indonesia's Education System

Cordella and Tempini (2015) elucidate that digital governance enables governments to optimize bureaucratic operations that once necessitated manual and multi-tiered procedures. The use of ICT enables online access to numerous government services, thereby reducing the time and costs associated with administrative processes. For example, licensing services that once required weeks can now be completed in days via computerized systems. recognize transparency as a crucial component of digital governance. They contend that digital platforms improve public access to information, allowing citizens to better understand government programs and oversee their implementation. This upholds the idea of public information disclosure as stipulated in Law Number 14 of 2008 about Public Information Disclosure.

Improved access to information enables the public to comprehend decision-making processes more effectively and to monitor policy implementation with greater transparency. Bannister and Connolly (2011) emphasizes the significance of digital governance in enhancing citizen engagement. Citizens can actively participate in government processes and offer input on public services through digital platforms like online portals and complaint systems. Citizen complaint applications such as *"Lapor!"* offer a venue for residents to submit concerns with public services. Additionally, social media and governmental platforms function as avenues for collecting public aspirations and engaging people in policy assessment. Janssen and Estevez (2013) underscore that open access to information enhances public confidence in governmental institutions. Access to reliable and timely information enhances citizens' confidence in governmental activities.

Cordella and Tempini (2015) asserted that digitalization facilitates enhanced tracking and monitoring of government policies, hence enabling more effective oversight and assessment. Puspitasari and Ishii (2016) observe that digital platforms facilitate citizen engagement in policymaking processes. This participation may manifest in several ways, such as virtual consultations, feedback systems, and participatory decision-making platforms. Such projects augment democratic government by empowering citizens in policy formulation. Murdhani (2025) observes that, in addition to infrastructure limitations, varying levels of digital literacy among the populace present a considerable obstacle to the execution of digital governance. Digital literacy includes both proficiency in using technology devices and an understanding of how to use digital services judiciously and securely. A 2021 poll conducted by the KADATA Insight Center revealed that merely 37.8% of Indonesians possessed a sufficient level of digital literacy. This inadequate comprehension results in disparities in access to and utilization of digital government services. Especially for the elderly and those in isolated regions. In the absence of enhanced digital literacy, the likelihood of service misuse, the proliferation of misinformation, and online fraud escalate.

Notwithstanding the abundant literature on e-governance, substantial deficiencies persist in its implementation within the educational sector of developing nations. Many studies concentrate on theoretical concepts or specific difficulties like infrastructure and digital literacy, lacking a thorough examination of the interplay between various aspects. Research in Bangladesh identifies challenges including inadequate teacher preparation and digital disparity, whereas studies in Indonesia underscore transparency and involvement, although neglect educational outcomes. Furthermore, there is a notable deficiency of comparative studies between Bangladesh and Indonesia. A thorough comparative analysis is required to investigate the execution of e-governance in education, incorporating technological, institutional, and human elements. This study analyses the present state of e-governance in education in Bangladesh and Indonesia, while conducting a comparative assessment of the primary hurdles encountered in its acceptance and implementation. It also assesses the potential of e-governance to improve educational governance, transparency, and accessibility in both situations.

2.4. Theoretical Framework

This study is based on Everett Rogers' Diffusion of Innovations Theory and the Technological Pedagogical Content Knowledge (TPACK) Framework. Rogers' theory explains the adoption of e-governance through factors such as perceived usefulness, social influence, and resistance to change, which are evident in the educational contexts of Bangladesh and Indonesia. Meanwhile, the TPACK framework highlights the technological, pedagogical, and content knowledge required for effective digital integration, helping to explain teacher readiness gaps and limited ICT competencies in both countries. These frameworks support the analysis of institutional and technological challenges in implementing education e-governance.

The TPACK Framework describes the knowledge instructors need to incorporate technology meaningfully into education. It highlights the interdependence of three kinds of knowledge: technological knowledge, instructional knowledge and content knowledge. This study shows that TPACK is helpful in understanding teacher preparation and capacity for efficient use of ICT in classrooms and educational administration. E-governance cannot be implemented effectively in the absence of teachers and administrators who are competent in the use of technology for teaching-learning, evaluation, communication and institutional administration even if digital technologies are accessible. Thus, the TPACK framework is

relevant to address the issues of digital literacy gaps, teacher training restrictions and insufficient pedagogical integration of ICT in Bangladesh and Indonesia.

This research is an attempt to combine these two approaches to build integrated theoretical knowledge of the application of e-governance in education. Rogers' theory accounts for the large-scale adoption of digital governance systems at the institutional and national levels, while TPACK accounts for the human capacity needed for effective classroom-level and administrative usage. The framework indicates that the effectiveness of e-governance in education is not only conditioned by digital infrastructure but also by teacher preparation, institutional support, digital literacy and user's willingness to accept technological change.

Infrastructure preparedness, internet connection, availability of digital devices, policy support and digital literacy are identified as major enabling elements in the study. These variables affect the implementation of e-governance systems and successful use of ICTs in education. Considering the strength of these circumstances, e-governance can increase administrative efficiency, transparency, accessibility, delivery of educational services, and stakeholder satisfaction. But the implementation of e-governance becomes partial, urban-centered and uneven when the infrastructure is insufficient and digital skills are limited. Therefore, this theoretical framework allows for a comparative examination of Bangladesh and Indonesia, which sheds light on the influence of technological, institutional, and human elements on the success or constraints of e-governance in education.

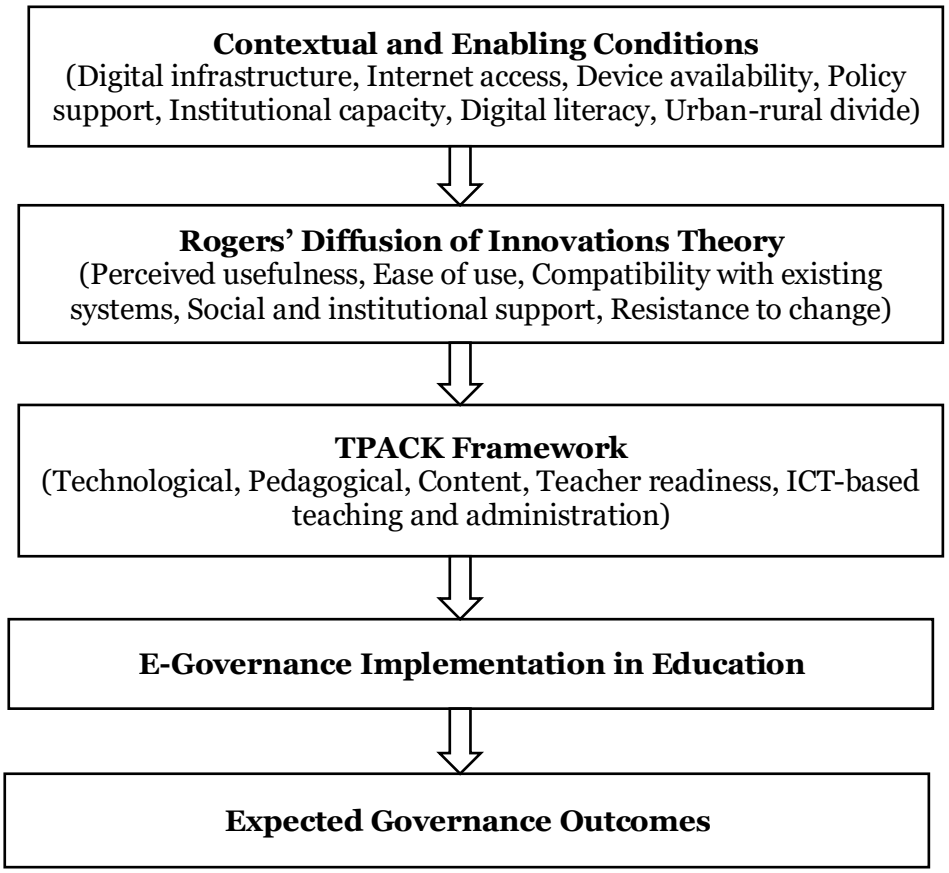

Figure 1. Theoretical framework for analyzing e-governance implementation in education in Bangladesh and Indonesia

3. Methods

This research employs a comparative case study methodology, considering Bangladesh and Indonesia as analogous units of analysis. This design facilitates a methodical evaluation of the e-government framework, digital infrastructure, and their effects on educational service delivery in each nation. The study used secondary data collected from many journal database (Scopus, Google Scholar, Springer, Web of Science, and Wiley), government reports, policy documents, international organization publications, and credible online databases related to e-governance and education in Bangladesh and Indonesia. Sources were selected based on relevance; credibility, publication quality, and recentness to ensure the reliability and validity of the analysis.

The two nations have numerous structural parallels. They are emerging economies in Asia characterized by substantial populations, geographically varied educational systems, and continuous national digitalization efforts. Simultaneously, they diverge in institutional, cultural, and infrastructural dimensions, rendering the comparison design analytically suitable. The data collection for this study is solely secondary, utilizing three primary categories of sources. Each area was chosen to guarantee comprehensive coverage, dependability, and pertinence to the research enquiries. The primary data source for this study is official government publications. These materials offer authoritative, policy-oriented insights into the planning, implementation, and evaluation of e-governance systems in both nations. Sources comprise the Education Development Plan, multi-year digital transformation roadmaps, and national ICT strategies from the governments of Bangladesh and Indonesia. It also encompasses the Report on e-Government from pertinent ministries and regulatory agencies.

The second dimension of data comprises independent research results and peer-reviewed scholarly publications. These resources provide essential, evidence-based evaluations that are contextual and enhance official government accounts. Case studies concentrating on specific e-governance initiatives in education, survey-based research documenting usage patterns and stakeholder experiences, and evaluation studies assessing the efficacy and equity of digital platforms. Reports and statistics from prominent international organizations provide impartial assessments of progress in digital education, learning outcomes, equity, and access to digital education, including development funding figures and digital infrastructure indexes from the World Bank and UNDP. Evaluations of e-governance readiness and human development assessments.

4. Results and Discussion

This following table 1 illuminates Digital Education & E-Governance between Bangladesh and Indonesia, comparing digital access, and ICT use in e-governance in education.

Table 1. Digital Education & E-Governance between Bangladesh and Indonesia

Indicator	Bangladesh	Indonesia
Internet access in schools	Many rural schools lack connectivity; over 90% previously reported without adequate access	About 39% of primary schools and 52% of secondary schools have internet
Schools with computers	Only about 8% of rural schools have computer access	Around 40-67% of schools have computers

Indicator	Bangladesh	Indonesia
ICT use in schools	Limited, especially outside cities	72.5% (primary & junior high) and 83.1% (senior high) using ICT (target)
Internet use (urban vs rural)	Large gap between cities and villages	71.8% urban vs 49.3% rural internet usage
Students' internet access	Uneven; infrastructure barriers in rural areas	About 77.5% of students have internet access
Household internet access	Growing but unequal	About 89.7% of households connected

Source: BANBEIS (2023), ITU (2023), Statista (2024), and UNESCO (2014)

4.1. E-Governance in Education: Bangladesh Perspective

Analysis of various online news portals and journals Bangladesh education system is not fully digitalized. Over 90% of schools lack reliable internet connectivity. Infrastructure problems (power, connectivity) severely limit digital education; only 8% of rural schools have access to computers. Urban schools have far better access than rural schools. This explains why e-governance tools (online admission, digital exams, etc.) are mostly urban-centered (Table 1). Overall Bangladesh's education system remains weakly digitalized due to poor infrastructure, limited internet access, and low ICT availability, especially in rural schools, making e-governance largely urban centered. This reflects a strong urban rural digital divide that continues to hinder nationwide implementation of digital education governance.

4.2. E-Governance in Education: Indonesia's Perspective

Some international organization reports and journal analyses on the Indonesian education system. The internet is available in about 39% of primary schools and 52% of secondary schools. Computers available in 40-67% of schools. ICT use in schools Primary & junior high: 72.5% senior high 83.1%. There are Internet usage gaps between urban and rural areas, with Urban at 71.81% and Rural at 49.30%. About 77.5% of students in Indonesia have internet access. Indonesia shows broader national adoption but still strong regional inequalities across islands (Table 1). Overall, an analysis of the current situation of e-governance in education in Bangladesh and Indonesia shows that they have a severe rural digital divide, low infrastructure availability, limited ICT integration in schools, urban-focused e-governance adoption, higher overall digital readiness, more schools using ICT systems, better connectivity that is uneven geographically, and a strong urban-rural disparity due to archipelagic geography. Both Bangladesh and Indonesia have made progress in digital education governance; however, Indonesia demonstrates broader institutional integration of ICT, while Bangladesh faces deeper infrastructure constraints that limit nationwide implementation. Overall, Indonesia shows comparatively higher ICT adoption in education, but persistent urban-rural and inter-island inequalities limit equal access, meaning e-governance is more developed but still unevenly distributed across regions.

4.3. Comparison between the Urban and Rural Condition

Table 2. Bangladesh Urban and Rural Condition

Metric	Urban	Rural
Internet Usage (2025)	71.4%	36.5%
Digital Literacy (High Score)	Higher baseline	0.3%
Online Class Access (Pandemic)	>32.5% seamless access	<32.5%; over 70% faced connectivity issues

Source: Mousumi (2023) and Shuvo (2025)

Analysis of various news and articles finds that urban areas show higher e-governance adoption in education, with internet usage at 71.4% compared to 36.5% in rural areas, widening the digital divide. In rural areas digital literacy remains critically low. Only 2 out of 6,500 households scored a perfect Digital Literacy Index in a 2019-2020 survey, while 50% scored ≤0.25. The online education market grew to USD 358.76 million in 2024 and is projected to reach USD 2,563.42 million by 2033 (CAGR of 24.42%), driven by urban access but constrained by rural infrastructure. During COVID-19, only 32.5% of students attended online classes seamlessly due to network and data costs, with over 70% of rural students facing connectivity issues (Table 2).

Table 3. Indonesia Urban and Rural Condition

Metric	Urban	Rural/Remote
Tech Integration	92% extensive use	Lower; only 28% stable internet
Internet Access	65% of schools connected	35% of schools connected; 65% lack access
Device Access (Children)	25% have computers	15% have computers
Electricity in Schools	Higher baseline	About 35% lack electricity

Source: UNESCO (2023)

Urban schools lead in digital tool integration, with 92% incorporating technology extensively into teaching, supported by platforms like Merdeka Mengajar used by over 3 million teachers. The government targets connecting 300,000 schools to the internet by end-2025, prioritizing urban areas, where 65% of schools have stable connections, versus 28% in rural areas. Rural and remote (3T) areas face severe gaps: 65% of schools lack internet access, 35% lack electricity, contributing to a 15% dropout rate and limited daily digital use. Only 15% of rural children have computer access compared to 25% urban areas, hindering e-governance tools (Table 3).

4.4. Technology Access on Education

Table 4. Schools with Computer Access by Education Level

Level	Bangladesh	Indonesia
Primary	42%	40-67%
Secondary	77%	40-67%
Higher Education	45%	High

Source: UNESCO (2023)

According to table 4, there is a significant difference in access to computers across education levels in Bangladesh and Indonesia. In Bangladesh, computer access is also skewed: it is high in secondary education but lower in primary and higher education. Indonesia, by contrast, has more equal access across levels and greater availability in higher education. Generally, digital integration is more stable in Indonesia, whereas there are gaps in various levels of education in Bangladesh.

Table 5. Schools with Internet Access

Level	Bangladesh	Indonesia
Primary	Limited access	39%
Secondary	53%	52%
Higher Education	45%	High

Source: UNESCO (2023)

Table 5 indicates that access to the internet in schools in Bangladesh is not as good as in Indonesia. In Bangladesh, the situation is at the primary level, where access is low; at secondary education, where it is approximately 53 percent; and at tertiary education, where it is moderate at about 45 percent, indicating gradual but incomplete development. Indonesia, on the contrary, shows more stable accessibility at the school level (approximately 39% at the primary and 52% at the secondary) and excellent, extensive connectivity in higher education. In general, the integration of the internet in Indonesia is more stable and developed whereas Bangladesh has gaps, particularly on the primary level.

Table 6. Student Internet Access

Country	Urban	Rural
Bangladesh	72%	50%
Indonesia	72%	49%

Source: Shuvo (2025), TBS (2024), and UNESCO (2014, 2023)

Table 6 demonstrates a similar urban-rural digital divide in internet access among students in Bangladesh and Indonesia. Access to the internet by students is around 72 percent in urban areas and declines in rural areas in both countries to approximately 50 percent in Bangladesh and 49 percent in Indonesia. This means that despite similar overall levels of access, rural regions in both nations remain very disadvantaged, which is why access to digital education should be improved and inequality in access minimized.

Table 7. ICT Integration in Teaching

Use of ICT in Education (% of schools)		
Level	**Bangladesh**	**Indonesia**
Primary	Low	72.5%
Secondary	Medium	83.1%
Higher Education	Medium	High

Source: BANBGE (2023) and UNESCO (2023)

Table 7 shows a significant difference in ICT use in education between Indonesia and Bangladesh. The primary level of ICT integration is low in Bangladesh; only secondary and higher education attain a moderate level, with slow but slight adoption. Indonesia, in contrast, has relatively high ICT uptake, with 72.5% at the primary and 83.1% at the secondary levels, and high ICT penetration in higher education. Overall, Indonesia demonstrates increasingly effective and consistent use of digital technologies in education, while Bangladesh is a developing country.

Table 8. Infrastructure Readiness (Electricity & Facilities)

Country	Schools Without Electricity (%)
Bangladesh	7.5%
Indonesia	Lower proportion; relatively better coverage

Source: Ajjawi et al. (2019) and UNESCO (2023)

Table 8 shows that infrastructural preparedness is also slightly lower in Bangladesh than in Indonesia. The proportion of schools with no electricity in Bangladesh is approximately 7.5 per cent, which means that the implementation of digital education tools is significantly obstructed. The opposite is true in Indonesia, where the percentage of schools without electricity is lower, indicating comparatively strong infrastructure coverage, though with some

difficulties in rural regions. All in all, Indonesia is better placed in terms of basic infrastructure, whereas Bangladesh still has gaps that impact e-governance in education.

Table 9. Basic Challenge of Bangladesh and Indonesia

Challenge	Bangladesh	Indonesia
Schools lacking ICT	>90% historically	>50%
Rural computer access	~8%	40-67% (overall schools)
Students with basic tech skills	24%	Moderate, varies
Rural internet gap	40% lack access	Large regional gaps
ICT integration in schools	Limited	Moderate (62-74% targets)

Source: ITU (2023) and UNESCO (2014)

Both Bangladesh and Indonesia face overlapping hurdles in e-governance adoption for education, primarily infrastructure deficits, low digital literacy, and rural-urban divides, though Indonesia edges ahead in EGDI rankings (Table 9).

Table 10. Comparative Insights

Aspect	Bangladesh	Indonesia
Urban Implementation	Strong	Strong
Rural Access	Limited	Moderate but uneven
Infrastructure	Developing	Relatively better
System Integration	Partial	More comprehensive
Geographic Barriers	Moderate	Significant (island nation)
Digital Literacy	Growing	Improving but varied

The comparative study (Table 10) of e-government in education in Bangladesh and Indonesia reveals that both nations have achieved significant success in urban implementation, where infrastructure and digital infrastructure are well established, but there are significant gaps in rural areas. In Bangladesh, the limitations are more severe due to underdeveloped infrastructure, which means limited access to resources and partial system integration, while Indonesia is characterized by relatively well-developed infrastructure and complete digital integration, despite significant geographic challenges as an archipelagic country. Also, both countries are becoming more digitally literate, although it is uneven, especially in rural areas. On the whole, the countries are both still grappling with rural access, which underscores the need to have specific policies targeting to narrow the digital divide in education, despite the fact that Indonesia seems to be ahead in terms of system development and integration.

4.5. Common Challenges

Bangladesh and Indonesia encounter infrastructure barriers, low digital literacy, and resistance to change in e-governance education adoption, particularly in rural areas. Therefore, both face significant challenges in implementing educational governance, particularly regarding infrastructure, digital literacy, and resistance to change. In rural areas, inadequate access to high-speed internet, computers, and reliable electricity remains a major barrier. Bangladesh struggles with overall connectivity, while Indonesia faces uneven connectivity across its remote 3T regions. Both countries' limited infrastructure, shortage of skilled personnel, resistance to change, and traditional methods slow down the adoption of digital education systems. Overall, these challenges highlight the need for improved infrastructure, skill development, and institutional support to successfully implement digital education systems (Table 11).

Table 11. Common Challenges

Challenge	Bangladesh Stats	Indonesia
Infrastructure (Rural)	Insufficient internet/electricity/data centers	65% schools have no internet; 3T gaps
Digital Literacy	76% overall; 0.3% rural high proficiency	Human capital/ICT shortages
Resistance/Training	Low ICT in Madrasas (25%); teacher reluctance	20% teachers trained (2019)
Budget/Scale	BDT 94, 711 Cr FY2025 education	N/A (quota-limited training)

Source: UNESCO (2023)

4.6. Opportunities

Bangladesh and Indonesia have made progress in improving e-governance to expand administrative efficiency, resource access, with Indonesia showing stronger overall digital capacity. Both countries have expanded access to learning through various platforms such as teacher portals and digital learning applications, benefiting especially rural users. Moreover, public -private partnership plays a significant role in addressing infrastructure gaps, with Bangladesh showing increased investment in digital initiatives, though further development is still needed. Both countries still require more effective and modern collaboration frameworks to ensure sustainable and cost-efficient implementation. Statistical analysis has shown that both Bangladesh and Indonesia face significant obstacles to implementing e-governance in education. Bangladesh faces a worse situation due to poor infrastructure and a lack of digital literacy, whereas Indonesia shows a rather better technological potential but still faces the issue of the regional gap and the unwillingness to transform digitally, especially in remote island areas. Statistically, both Bangladesh and Indonesia face significant difficulties in e-governance in education.

4.7. Implications

This research has several practical implications for policymakers, educators, and other stakeholders. The study reveals to policymakers the necessity of strategic planning and investment in digital infrastructure and inclusive policies. In the case of educational institutions, it highlights the need to adopt user-friendly e-governance systems and ensure that staff are properly trained to use them. Also, the research recommends that a holistic approach is necessary to implement successful changes since this involves technology, human resource development, and institutional support. The contextual and slow implementation of e-governance is vital in the case of developing nations such as Bangladesh and Indonesia. Continuous feedback mechanisms, pilot projects in rural areas, and adaptive strategies could help ensure sustainability. Overall, this paper can serve as a reference for enhancing digital governance in the education sector and eliminating the urban-rural digital gap.

4.8. Limitations

The research is purely secondary data-based, which introduces several limitations. To begin with, the validity of the results depends on the precision and quality of the earlier sources, which may be biased or outdated. Second, the various studies are not homogeneous in their data collection methodologies, thus, it is not easy to compare them directly between Bangladesh and Indonesia. Thirdly, the research is unable to capture recent trends or immediate shifts in e-governance implementation, particularly those emerging in fast-changing digital industries. Fourth, there is no primary data (interviews or surveys) to provide the in-depth analysis of user experiences, institutional challenges, and practical outcomes.

5. Conclusion

According to the results, the following recommendations are possible: investment in a stable internet connection and access to digital devices should be made in both countries, especially in rural areas. Also, governments and educational institutions need to provide mass education to teachers, students, and administrators. Additionally, have clear policies in the country with monitoring and evaluation systems to ensure proper implementation of e-governance. Moreover, the partnership with the private technological firms can stimulate technological innovation and resource delivery. Lastly, fieldwork, interviews, and surveys can be used in the future to provide deeper insights into real-life issues and user satisfaction. This study demonstrates that while Bangladesh and Indonesia have made notable progress in adopting e-governance in education, its impact remains uneven due to persistent infrastructural and digital literacy gaps, particularly in rural and remote areas. The findings collectively suggest that digital transformation in education is more advanced in urban settings but still limited in achieving inclusive national coverage.

There are also several issues in the study. Internet connectivity and usage remain significant issues, especially in rural regions where modern equipment is lacking. The plan can be even harder to implement due to a lack of knowledge among students, teachers, and administrators about how to use technology effectively. In addition, the two nations are late to embrace e-governance, as individuals in conventional education systems are not willing to change.

Although there are issues, the analysis reveals significant opportunities'-governance has the potential to improve government functioning by simplifying processes such as enrollment, grading, and resource management. It is also easier for students in underserved regions to access educational materials through e-learning programs. Overall, the study concludes that e-governance in both countries is at a transitional stage showing clear potential to improve efficiency, transparency, and access, but requiring stronger infrastructure, capacity building, and institutional coordination to ensure equitable and sustainable implementation across all regions.

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