Digital Transformation of Higher Education in Bangladesh: Lessons from Japan

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Abstract- The field of higher education is currently experiencing a worldwide transition towards digitization. Given its young population and growing technological accessibility, Bangladesh is well-positioned to capitalize on this period of change. Digital evolution fosters the expectations of the 21st century, and as a result, it is a significant concern for Bangladesh's tertiary-level education sector. On the other hand, Japan is known and famous worldwide for its miraculous economic development and technological advancements. This research explores how Japan's digital transformation strategies in higher education can inspire Bangladesh by identifying key challenges such as low investment, limited innovation, and weak industry-academia-government collaboration. Using qualitative methods, the study highlights Japan's successful initiatives and suggests how Bangladesh can adopt these strategies to enhance graduate employability and improve learning outcomes. Consequently, the Ministry of Education (MOE) of Bangladesh ought to invest more in infrastructure development. Because students' abilities differ in rural and urban areas, Bangladesh's higher education system should combine digital tools to emphasize students' varied needs and learning preferences. Lastly, Bangladesh can help students like those in Japan work remotely by developing new digital jobs and growing the employment market in the e-commerce and digital business sectors.

Keywords: Digital Transformation, Higher Education, Technology Integration, Bangladesh, Japan.

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1. Introduction

Digital technology integration into higher education systems signifies a substantial shift in instructional strategies, administrative processes, and the educational framework (Gong & Ribiere, 2021). Rapid technological improvements and global connections drive a digital revolution aiming to improve educational access, quality, and relevance in the 21st century (Alam, Hassan, et al., 2023b). Bangladesh is poised for significant educational transformation due to its thriving economy and expanding youth population. This study compares Bangladesh to Japan, a nation known for its cutting-edge educational practices and technological advancements, to examine the effects of digital transformation on higher education in Bangladesh. This research aims to draw actionable lessons from Japan's experience with digital technology integration in Bangladeshi higher education institutions. Additionally, the study will examine Japan's digital transformation process to create a robust framework for Bangladesh, boosting its higher education sector's resilience, efficiency, and global competitiveness (Khalid et al., 2018). The primary goal of this study is to clarify how digital technologies can be strategically incorporated into Bangladesh's university system by learning from the Japanese model.

1.1 Problem Statement

Although awareness of the significance of digital technology in higher education is increasing, Bangladeshi institutions face considerable challenges in effectively adopting these technologies. This study examines the barriers to digital transformation in Bangladesh's higher education system while leveraging insights from Japan's strategies for addressing similar challenges. It proposes tailored approaches to accelerate the integration of digital learning in universities and colleges throughout Bangladesh. Several factors hinder the effective incorporation of digital education into academic curricula in Bangladesh, including outdated syllabi, a lack of digital resources, and insufficient teacher training. Furthermore, redefining student-professor interactions remains challenging, as traditional teaching methods prevail and many educators lack the skills to engage in digital learning. Additionally, the digital divide, inadequate infrastructure, and weak industry-academia collaboration restrict the ability of digital platforms to connect universities with the broader society. Although some progress has been made, these issues must be addressed for Bangladesh to achieve digital transformation in its higher education system successfully.

## 1.2 Rationale of this Study

Digital evaluation is crucial for advancing higher education in Bangladesh, contributing to the Digital Bangladesh vision and improving global competitiveness. However, universities struggle with inadequate infrastructure, limited faculty training, and a lack of strategic policies (Chowdhury et al., 2018; Shahriar et al., 2021). Policymakers need a clear roadmap for the effective integration of digital learning. Research shows that while a few institutions have set up centers for teaching excellence (Raqib, 2019), the majority lack structured training for faculty, which creates resistance to digital education (Parvin, 2013). Academic institutions could greatly benefit from Japan's systematic ICT implementation, emphasizing teacher readiness and digital literacy (Kusano et al., 2013; Zhang, 2008). Projects like u-Japan and Mobile-Assisted Language Learning (MALL) in Japan demonstrate how comprehensive technology adoption can enhance education (Zhang, 2008). In contrast, Bangladesh's digital divide, caused by socioeconomic disparities and limited device access, hinders equitable learning opportunities (Alam et al., 2023). This study proposes tailored solutions modeled after Japan's methods to bridge this gap. By improving digital infrastructure, training educators, and refining policy frameworks, this research seeks to elevate Bangladesh's higher education system, fostering quality education, accessibility, and lasting sustainability in digital teaching practices.

2. Literature Review

2.1 Roadmap of Digital Transformation in Higher Education

Digitalization represents a modern manifestation of global transformation (Zaoui & Souissi, 2020). Information and Communication Technology (ICT) has profoundly changed how learning and teaching occur, enhancing student productivity (Khan et al., 2012). This concept encompasses a series of significant and coordinated shifts within society and the workforce that create new academic and administrative frameworks (Brooks & McCormack, 2020). Khalid and associates (2018) offered a structured framework for Higher Education Institutions (HEIs) to embrace a digital strategy, ensuring they remain abreast of technological advancements. Teachers' Technology-Based Practices (TPACK) should be adaptable and inclusive, accommodating various teaching styles and methodologies. The initial content-specific TPACK taxonomy has been evaluated, although further fine-tuning is required. It is crucial to compare content-based activity types with content-neutral instruction. It is essential to collaborate with content specialists, technology developers, researchers, and practitioners (Harris et al., 2009).

Figure 1. Process of Effective Digital Transformation Process
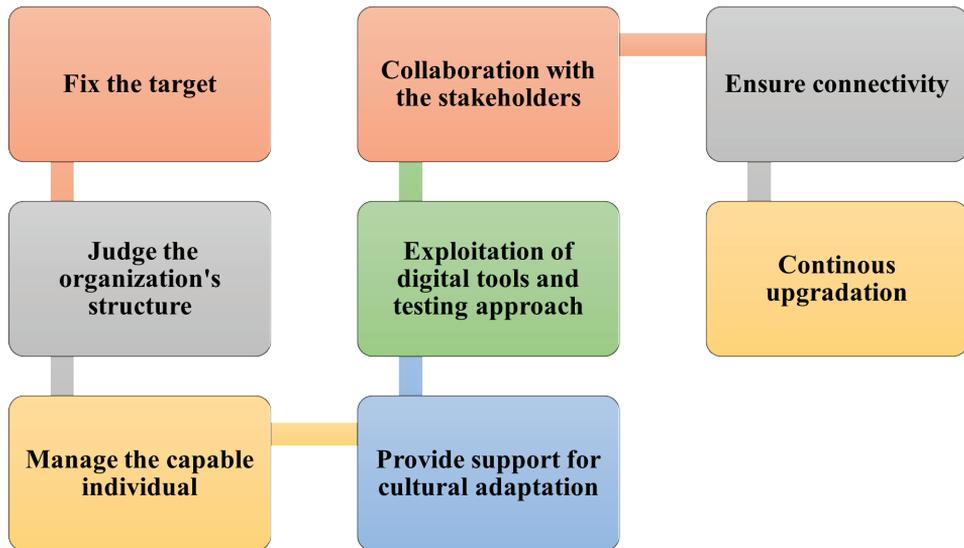
Source: Created by the author based on Vial, 2019

By providing an innovative learning platform, using digital technologies in higher education institutions improved student learning (Figure 1). Since 2017, integrating the Fourth Industrial Revolution (4IR) into higher education has become increasingly popular. The significance and functionality of this system increased due to the impact of COVID-19, even if it was initially implied at the beginning (Aditya et al., 2021). Developed nations can typically manage this substantial transformation, but undeveloped and developing nations must implement change. The institution must first modify its surroundings to align with the new education system, and subsequently, it should guarantee technological adaptation and integration. Bygstad et al., (2022) propose three steps: aligning digital education with subjects, redefining relationships between students and professors, and utilizing the digital learning space to connect universities with broader society (Ahsan et al., 2022).

To build a company that is prepared to grow, adapt, change, and evolve, digital transformation entails investing in both people and technology. The COVID-19 pandemic has forced the higher education sector to switch to online instruction, but it is still unclear how this will affect student engagement and academic performance. Research is necessary to comprehend the actuality of online learning, provide financing for pedagogical innovation, and establish evidence-based policies for the current situation (Shohel et al., 2022). When examining the impact of cloud computing, several factors were found, including

inadequate infrastructure, service availability, educational utility, resource requirements, cloud management capability, and staff training. Educational institutions can enhance cloud computing adoption by focusing on these characteristics and extending the study to all universities and institutes in Bangladesh, as Sultana et al., (2017) identified. A study on Bangladeshi university students' utilization of mobile devices for learning identified four qualitative aspects: storage of materials, information availability, effectiveness of m-learning, and cooperation facilitation (Khan et al., 2023).

2.2 A Brief Review of Current Higher Learning and Digital Integration in Bangladesh

Education is a fundamental societal requirement in the 21st century, yet Bangladesh still needs to achieve its highest literacy rate. The digital age offers numerous promises to revolutionize the current way of life compared to previous decades *(Table 1)*. The education industry in Bangladesh is advancing rapidly. According to experts and sociologists, Bangladesh has yet to embrace digital technology in elementary and upper secondary education fully. The tertiary education industry warmly received it. Education at the university level develops a country's future leaders. The digital revolution has changed job loss and growth standards in Bangladesh and worldwide. Bangladesh's higher education system should provide modern skills to participate in the global economy (Al-Zaman, 2020). Higher education continuously boosts Bangladesh's short- and long-term GDP. Information technology in Bangladesh benefits the nation's economic growth and institutions of higher learning. Technological advancement boosts economic development and enhances people's capabilities to accomplish previously unattainable tasks (Rahman, 2020).

Table 1. Changing Nature of the Fundamental Sector of Education

Fundamental Elements	Causes of the shifts	Traditional Education	Online Education
Teaching	The spatial dimension and nature of interaction	Classroom-based, in-person, and lecture-centered instructional methods	The utilization of online classrooms and virtual lectures
	Components of instruction	Intangible and tangible components, such as books, articles, and publications	The uses of software and digital content, such as slides, infographics, and audio-visual documents
	Acquired knowledge and anticipated proficiency.	Knowledge monopoly, linear one-on-one engagement, and reduced competition	Varied, engaging, more efficient, and fiercely competitive.
Learning	The primary sources of information	Tactile sources, such as books, knowledgeable individuals, and libraries	Intangible sources include E-books, blogs, online peer groups, and videos.
	Engagement and Constraint	Inactive engagement and restricted availability of information	Unrestricted and interactive access to information
	Unimpeded and dynamic availability of information	Focused on acquiring knowledge	Focused on expertise and understanding
Institution	Temporal and spatial condition	The historical aspect of the physical environment	Accessible at any location and at any time
	Knowledge accessibility	The issue of limited access is affected by various phenomena such as income, position, gender, race, and religion.	Unrestricted access, regardless of social factors
	Fundamental characteristics	Localized, homogeneous, minimal, and negligible interaction and exchange, limited competition	Global variety, enhanced interaction and trade, intensive competitiveness on a large scale

Source: (Al-Zaman, 2020)

Ahsan et al., (2022) studied tertiary-level teachers' view of Pedagogical, Technological, and Content Knowledge (TPACK) and the demographic elements that influence it. Results indicate that technology knowledge is ranked the lowest, with technological content knowledge and subject knowledge given higher priority. Demographic factors like gender, teaching level, ICT training, type of university, and academic discipline impact TPACK *(Figure 2)*.

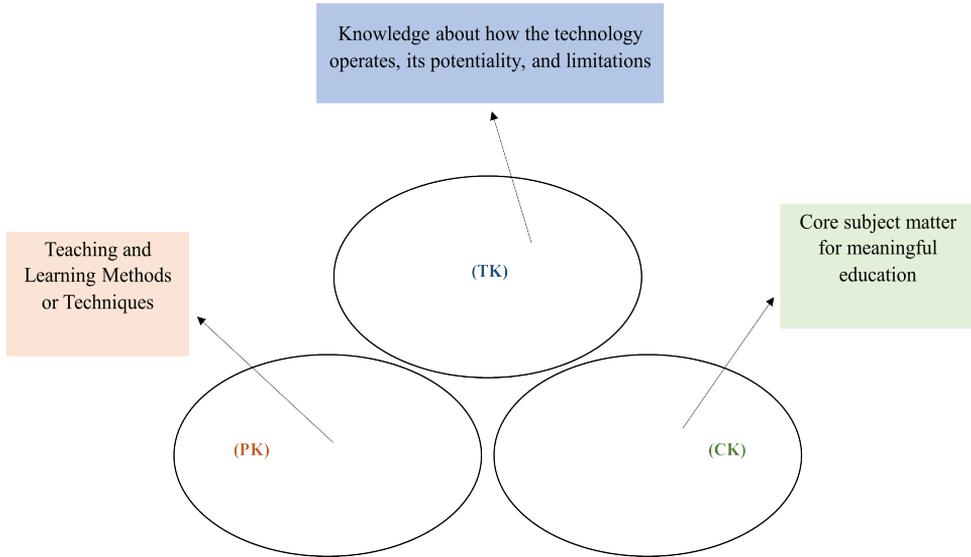## 2.3 Learnings from Japans Digital Education Initiatives

Many businesses believe that digital transformation (DT) is crucial in a constantly changing world. Due to its widespread use and frequent misuse, DT has caused much confusion. There is an urgent need to improve Design Thinking's (DT) conceptual rigor (Gong & Ribiere, 2021). Consequently, DT needs to provide some conceptual rigor. Taimur and Onuki (2022) emphasized

Higher Sustainability Education (HSE) while considering the implementation of Digital Thinking (DT) using the Digital Transformative Pedagogy paradigm. It describes how two courses were created and used in Japan and Germany. It also demonstrates how DT effectively incorporates Digital Transformative Pedagogy (DTP) elements to establish a nurturing learning environment. The influence of the ICT environment on teachers' attitudes is highly valued in Japan.

Japan has shown the advantages of using technology in elementary classrooms to prepare pupils for their future in a global world. The educator's perspective on technology use in the classroom reflects how effectively technology will be incorporated into instruction (Kusano et al., 2013). Zhang (2008) examines the u-Japan project in Japan's higher education system, specifically the need and readiness for widespread learning at Japanese universities. The language learning supported by mobile devices (MALL) initiatives is also summarized in this study. It evaluates how widely used technology is in teaching languages to millennial and neo-millennial students in Japan and worldwide. Zhang discusses the challenges and advantages of incorporating widespread technologies in higher education environments. Ferreira's (2019) Qualitative research study focused on practical action. He pinpointed three main obstacles to ICT integration: insufficient availability of computers, projectors, and internet connectivity, software complexity, and faculty focus on learning objectives and outcomes. Recommendations for educational leadership involve outfitting non-computer classrooms with internet-connected gadgets, ensuring dependable Wi-Fi access, establishing a theoretically based ICT training program, and employing educational technologists to offer technical assistance.

An analysis of worldwide research on sustainable management in the education sector between 1986 and 2019 revealed an exponential increase, especially in the past five years. Key terms include sustainability, higher education, innovation, and technology, as Sarker et al., (2020) mentioned. Some universities in Bangladesh have developed centers for excellence in teaching and learning to enhance university staff members' pedagogical knowledge and abilities (Raqib, 2019). Mandatory teacher training is seldom well appreciated, and conflicts between trainers and faculty members and psychological preparedness can occur in higher education (Parvin, 2013). Although many departments need more ICT resources, technology integration is essential for high-quality instruction. While pedagogy departments exist in universities worldwide, these departments have yet to be formed in Bangladeshi universities. Participants in the workshop recommend that colleges launch certificate programs in higher education and look for recent graduates with degrees in education to serve as training facilitators. Figure 2. The TPACK Framework (Here, TK means Technological Knowledge, PK refers to Pedagogical Knowledge, and CK, conversely, expresses Content Knowledge.).

Figure 2. The TPACK Framework

Knowledge about how the technology operates, its potentiality, and limitations

Core subject matter for meaningful education

Teaching and Learning Methods or Techniques

(TK)

(PK)

(CK)

Source: (Koehler and Mishra, 2009 & Ahsan et al., 2022)

The transformation of HE through digital technology in Bangladesh has had favorable effects during COVID-19, but its negative consequences are increasing. The emphasis on practical classes, group discussions, and lab exams must be improved, and finding long-term substitutes is expensive. Extended computer usage is linked to increased susceptibility to heart disease, diabetes, obesity, cancer, depression, and musculoskeletal issues. Policymakers should devise measures to tackle these concerns (Hossain, 2022). Suppose Bangladesh wants to achieve its goals of becoming a middle-income, technologically advanced nation by the 2030s. In that case, it must prioritize helping secondary and upper-secondary students develop digital skills. Nonetheless, many obstacles in the nation stand in the way of seamless online education. Significant obstacles are presented by inadequate technology infrastructure and restricted access to gadgets and the internet. Financial barriers might sometimes stand in the way of advancement. Teachers and students alike have experienced significant stress and psychological resistance due to the lack of computer literacy (Shahriar et al., 2021).

According to Chowdhury et al., (2018), ICT integration in higher education is insufficient because pedagogy and social interaction, two of the three fundamental learning components, are lacking in the learning environment, even when

technology exists. As per the study by Alam et al. (2023) based on the Digital Divide Theory, most students have positive attitudes toward digitalization; nonetheless, disparities result from access gaps to digital resources. Students' gender, socioeconomic status, and prior exposure to digital media significantly impacted their perceptions. Sarker et al., (2019) investigate the feasibility of integrating e-learning via learning management systems (LMS) in HEI in Bangladesh. Although students widely adopt e-learning, there are certain drawbacks, including poorly designed instructional materials and technical difficulties like erratic internet connectivity.

This study suggests a collaborative approach involving students, professors, administrators, and policymakers to optimize the utilization of e-learning platforms. The capacity of public institutions in Bangladesh to effectively compete in the global market is hindered by a lack of digital literacy among administrators and instructors in higher education, as well as the increasing reliance on digital education infrastructure and technological integration. Government efforts to adopt and implement new educational technologies within institutions are progressing slowly or ineffectively. A broader adoption of digitalized education is essential for Bangladesh to advance toward modernization through improved teaching and learning methods (Al-Zaman, 2020).

3. Research Method

This qualitative research utilizes case studies, surveys, interviews, and document analysis to generate new insights (Johnson & Christensen, 2017). A qualitative approach was selected to explore the challenges posed by the digital revolution in higher education, particularly in Bangladesh, while drawing on comparative findings from Japan. Primary data were gathered from 200 participants representing key stakeholders such as students, educators, employers, employees, and industry representatives. The survey employed a standardized online and in-person questionnaire to ensure a diverse and representative sample. The effectiveness and obstacles of digital education have been primarily addressed from the participants' viewpoint. Therefore, a digital policy that aligns with this challenge must be implemented effectively.

Additionally, interviews in a semi-structured format were carried out with chosen experts from academia, policymakers, and industry to better understand policy implementation issues and workable solutions. The document analysis included official government reports, reputable publications, and scholarly journals to support the findings. This study applied thematic analysis, which involves a six-step procedure (Creswell, 2014; Fowler, 2013), to ensure systematic identification of significant topics linked to digital education issues and strategies. The digital divide theory, transformative learning theory, and higher education

theory served as analytical frameworks for critically interpreting data. The combination of interpretivism and pragmatic philosophy allowed the production of practical proposals customized to Bangladesh's setting, influenced by Japan's digital education developments. Ethical considerations were strictly followed, ensuring participant confidentiality and voluntary participation. This rigorous methodological approach enhances the credibility and applicability of the study's findings.

Table 2. Detailed Sampling

Participants Groups	Criteria of Selection	Sample Size	Methods
Targeted Participants (purposely selected)	Selected students studying at the tertiary level, as well as those who completed graduation in both Japan and Bangladesh	200	Survey (mostly open-ended questions) and semi-structured interviewee.
Experts, Policymakers, Employers, Employees, and Industry representatives	Faculty members and government officials who worked in the education sector were selected based on their experiences. Industry representatives from various companies have been interviewed based on the purpose of this research, which is to clarify the academic and industry gaps resulting from digital literacy.	15	In-depth Interview

Source: Created by the Author.

4. Findings and Discussions

## 4.1 Embracing Digitization in Bangladesh's Tertiary Sector

4.1.1 The Changes Perceived in Teaching Methods

The digital revolution is significantly changing how education is taught in Bangladesh, as mentioned in *Figure 3*. In addition to replacing textbooks or other resources, its primary focus is on altering knowledge and how it is derived. Instead of the traditional approach, higher education institutions now focus on ensuring students are more involved in their studies. Various technologies offer interactive simulations to make studying more engaging and enjoyable and to capture students' attention. A scientific lab or physical education is one context for this. Students used to memorize this from texts

without understanding the concept. People can now see how the human body functions because of digital technology and virtual reality developments (Basharat & Alam, 2024).

Additionally, digital learning's contribution supports customized growth. Instructors can monitor students' circumstances and development using digital tools. As a result, they can recommend areas for development and learning speed. DX has also had a significant update, with greater accessibility. A participant from the University of Dhaka mentioned that his department offered online classes during the COVID-19 pandemic. Despite living in Bandarban, a remote area of Bangladesh, he could participate in all of his lectures and tests using internet technologies and applications. He described this as a game-changer for his life because it allowed him to gather resources anytime and anywhere quickly. Since transformation and digital skills are broad concepts, they require diverse skill sets. These days, educators emphasize critical thinking, problem-solving, and various communication skills (Zaoui & Souissi, 2020).

Figure 3. Digital Transformation and Changes in Teaching Methods
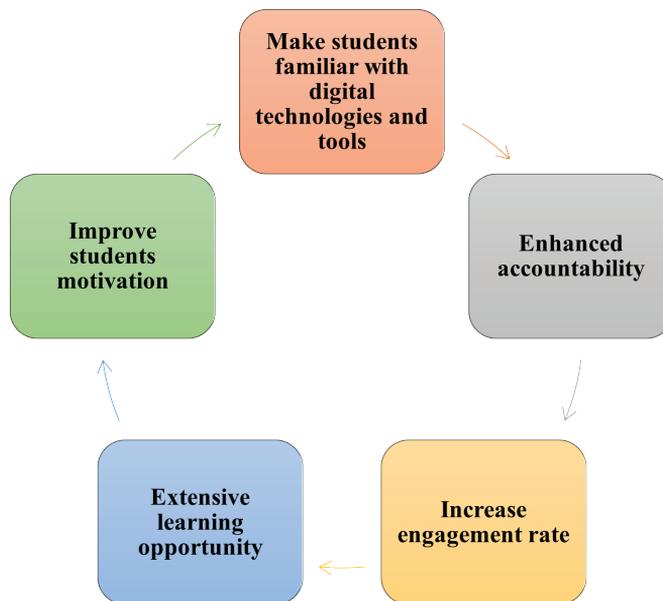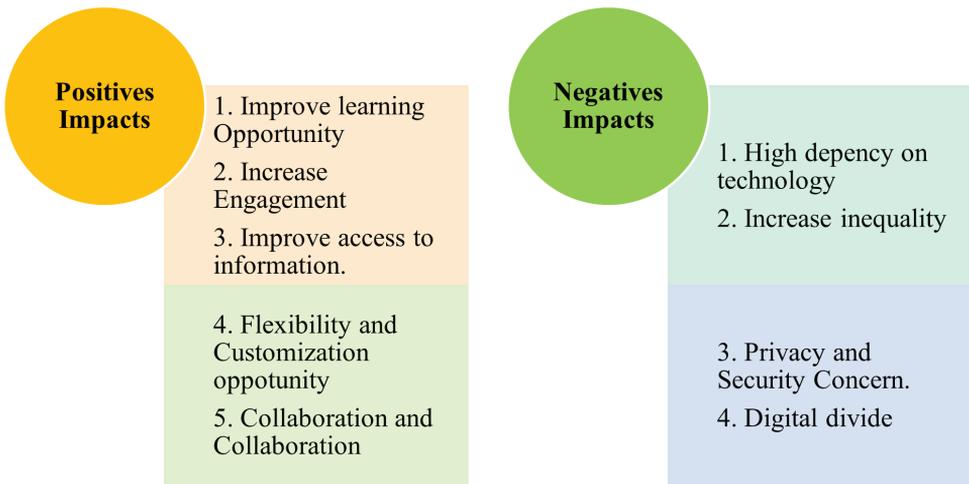

Source: Created by Author Based on the Survey Data.

4.1.2 Student Engagement and Interaction in the Classroom: Positive and Negative Impacts

The sound and harmful effects of utilizing digital tools in the classroom have altered learners' involvement and interaction *(Figure 4)*. Virtual reality (VR), simulations, and games interest boring lectures, while personalized learning lets teachers see how their students are doing and adjust their lessons accordingly. Online discussion forums and polls encourage people to think critically, communicate effectively, and work together as a team. By making course materials available around the clock, online learning systems allow students to continue their studies even after class has ended. However, there are obstacles, such as a digital gap, diversions, and technological failures. It is critical to resolve these issues and guarantee that every student has the same opportunity to fully access technology to use digital transformation (Hasan et al., 2024).
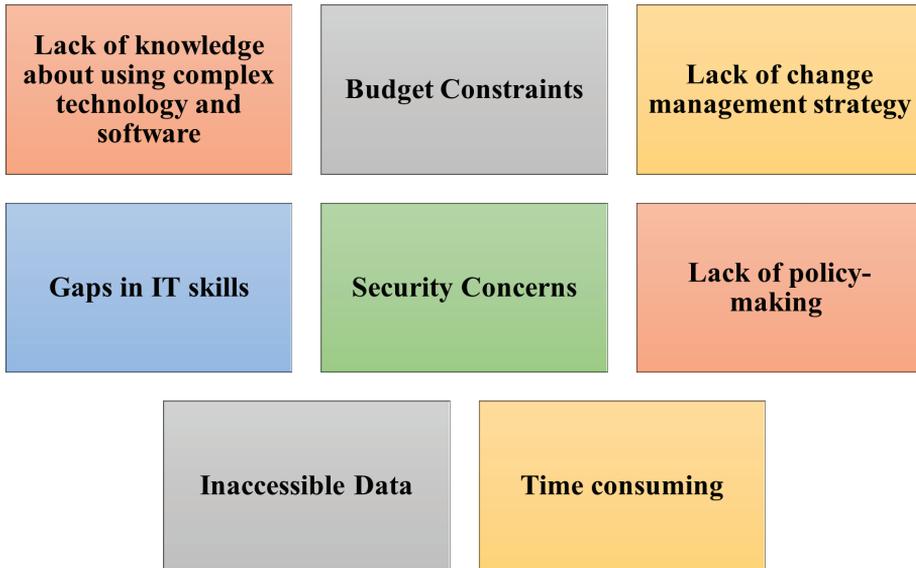
Figure 4. Positive and Negative Impacts of Integrating Digital Technology

Source: Created by Author Based on the Survey and Interview Data

4.1.3 Challenges Faced While Using Digital Tools

Figure 5. Challenges Faced at the Time of Using Digital Tools

| Lack of knowledge about using complex technology and software	Budget Constraints	Lack of change management strategy
Gaps in IT skills	Security Concerns	Lack of policy-making
Inaccessible Data	Time consuming	

Source: Created by the Author Based on the Survey and Interview Data

The digital divide is the biggest issue that Bangladeshi students are dealing with. Despite all the progress made in the 21st century, reliable internet access remains an issue in Bangladesh. Students in nations like Bangladesh tend to be from middle-class backgrounds and lack significant financial independence. Technology that can be accessed digitally requires mobile devices and PCs. The gadgets might be available to students with enough funds. However, in more remote places, the inverse is true. For many people, the idea of having a laptop to use for schoolwork is as fantastic as a fairy tale. There needs to be an apparent disparity in the availability of digital gadgets for individuals from low-income families. Power outages are another troublesome problem. The electricity needs of industrialized nations like Japan and the United States are adequately met. However, power outages can happen anytime in a nation such as Bangladesh. This issue has a detrimental effect on both online learning and research. Many people in Bangladesh find Bengali more comfortable because it is the country's official language. However, obstacles arise occasionally due to Bangladesh's unfortunate dearth of educational content. Adapting to the latest developmental shifts requires specific knowledge and skills from elder-generation teachers (Brooks & McCormack, 2020). This is necessary for them to modify how they utilize digital resources in the classroom. Finally, social media accessibility may prevent you

from using digital platforms for studying if you lack motivation. Another significant barrier is data security. Depicted in *Figure 5*.

4.1.4 Cultural or Societal Differences in the Adoption Process between Bangladesh and Japan

Figure 6. Cultural and socioeconomic variations in digital technology adoption between Japan and Bangladesh
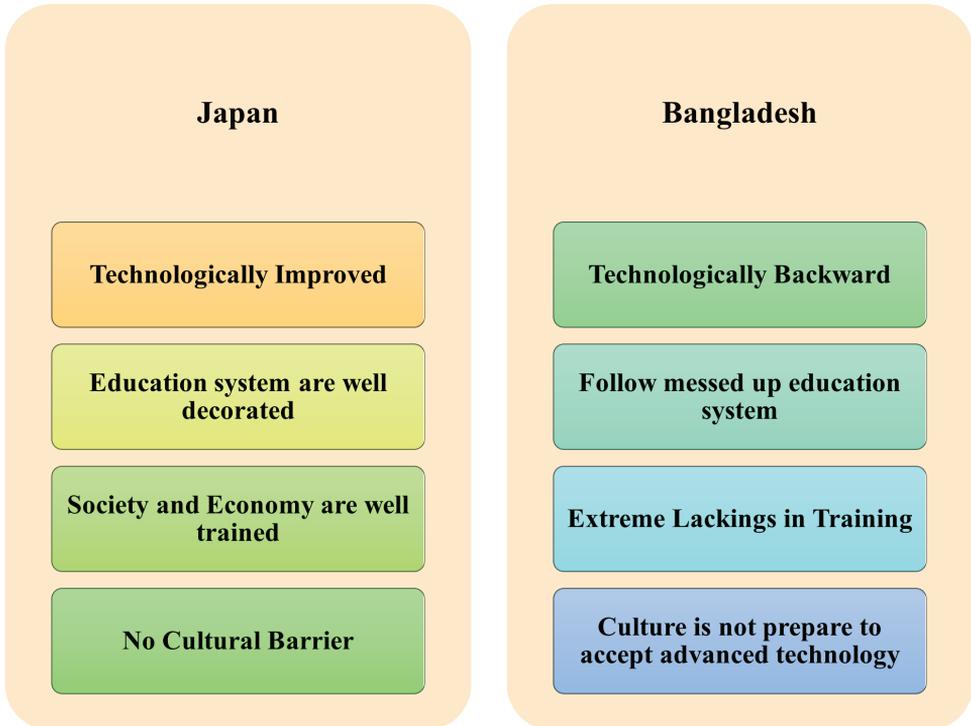
Source: Created by Author Based on the Survey and Interview Data

Cultural and societal elements affect the adoption and application of digital education tools in Bangladesh and Japan. Japan places a high emphasis on tradition and conformity, but Bangladesh recognizes the significance of digital tools in addressing infrastructural and accessibility obstacles *(Figure 6)*. Nevertheless, the prevailing societal norms that stress the bond between teachers and students and the memorization of information necessitate a more refined method of utilizing digital resources. The focus on collectivism and collaborative learning in Japan renders digital tools well-suited for group activities or peer evaluation. The effective incorporation of digital tools that foster student autonomy in Bangladesh may necessitate cultural adjustments. To enhance the competence of educators, teacher training programs in Japan must

prioritize technology integration (Alam et al., 2023). Adopting updated digital innovation in Bangladesh is hindered by considerable difficulties, namely lower levels of digital literacy and limited infrastructural development. Japan's school system strongly emphasizes standardized testing, resulting in a notable recognition of the value of digital products for exam preparation and practice.

Nevertheless, Bangladesh acknowledges the significance of holistic education and the utilization of digital resources that encourage human growth by providing creative knowledge. To optimize the effectiveness of digital tools in educational settings, educators in Bangladesh and Japan must recognize and understand the interrelated cultural and socioeconomic factors. By addressing these challenges, individuals can improve their use of digital resources and support comprehensive learning development within their respective nations.

4.1.5 Initiatives That Universities in Bangladesh Can Undertake to Further Advance the Digitization of Education

Here are several initiatives that universities in Bangladesh can implement to promote the digitization of education:

a) Infrastructure and Access

Improve IT infrastructure through collaboration with telecom providers and government entities to bridge the digital divide by offering accessible devices and offline learning materials. This cooperation is crucial for establishing reliable backup systems and utilizing digital learning tools.

b) Faculty Development and Proper Support

Participants propose offering digital literacy training, fostering creativity, and cultivating a peer-learning culture among faculty members to seamlessly integrate technology into teaching methods. Additionally, the proposal suggests establishing incentive and recognition programs to encourage faculty to adopt digital tools while assisting colleagues in their technology integration efforts.

c) Curriculum and Content Development

This initiative focuses on boosting the production of Bangla content and incorporating project-based learning, simulations, and real-life case studies into the curriculum to address language obstacles students encounter in Bangladesh. In addition, it aims to promote the use of Open Educational Resources (OERs) among faculty to lessen textbook expenses and enhance access to quality learning materials.

d) Student Engagement

Digital literacy training comprises workshops and sessions designed to equip students with essential digital skills, such as navigating online platforms, critically

assessing information, and practicing safe online behavior. It is suggested to have a dedicated IT support team to resolve technical issues and form virtual student communities to encourage engagement, the exchange of ideas, and collaboration within the digital learning environment.

e) Evaluation and Continuous Development of the Process

Feedback is collected through surveys and focus groups, allowing for an understanding of experiences and potential improvements. Staying updated on technological advancements is crucial for continuous improvement in the learning process, promoting innovative tools and resources.

4.1.6 The Future of University-Level Education in Bangladesh, With the Ongoing Progress of Digital Technology

Given that technology is constantly improving, Bangladesh has good prospects for advanced study in the future. By offering equal access to educational resources and opportunities regardless of socioeconomic background, digital technologies can potentially remove barriers. Distant learning methods and open educational resources can be used to achieve this goal. The improved accessibility can reduce the inequality between urban and rural areas, giving a larger population better access to tertiary education (Aditya et al., 2021). Digital technologies enable the delivery of personalized learning experiences that accommodate each student's distinct requirements and inclinations. By tailoring learning paths, content delivery, and evaluations, educators can enhance student learning outcomes using artificial intelligence, data analytics, and adaptive learning platforms. There are a few ethical guidelines when utilizing digital tools in the classroom *(Figure 7)*.

Figure 7. Ethical Consideration During Using Digital Technology in Education
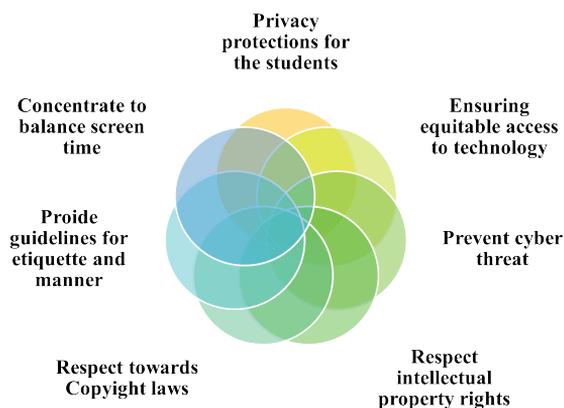
Source: Created by the Author Based on the Survey and Interview Data

Using customized teaching approaches can successfully meet each person's unique needs in Bangladesh, where classes usually include students with various modified learning systems, encouraging increased engagement and academic success (Alam & Ogawa, 2024). The advent of digital technologies has significantly contributed to facilitating improved collaboration and global connectedness among students, teachers, and institutions worldwide. In Bangladesh, students can forge relationships with peers and experts from diverse nations, partake in virtual collaborative endeavors, and actively involve themselves in cross-cultural educational encounters via online platforms.

4.2 Lessons from Japan

4.2.1 Government Policies and Initiatives That Have Helped Incorporate Digital Technologies into Japanese Higher Education Institutions

The effect of globalization on higher education has prompted the Japanese government to urge internationalization as a reform goal (Alam, 2022). As a result of this strategy, local institutions are now more competitive, and academic networks connecting universities worldwide are growing. It is still being determined if these initiatives have directly improved Japanese higher education's global competitiveness and adaptability. Japan has prioritized the DT of its HES in its drive for globalization. Initiatives promoting global collaboration and innovation have driven this transition. The government promotes thorough internationalization in higher education institutions by incorporating global resources and viewpoints into academic and service goals. Japan has actively promoted foreign exchange programs and initiatives to draw in foreign applicants, such as the 100,000 Foreign Students Plan and the prestigious Japanese Government scholarship. Through digital platforms and tools, these initiatives have improved Japanese universities' international recognition and promoted incorporating digital technologies into teaching methods to meet the needs of a wide range of students.

The Japanese government has also launched national policy initiatives to advance internationalization in higher education, such as Go Global Japan and the Top Global University scheme. These efforts have set specific targets for increasing the foreign student population in Japan and motivating Japanese students to pursue studies abroad. As they work to achieve these objectives, educational institutions recognize the importance of digital technology in promoting global cooperation, information sharing, and virtual mobility. Initiatives that encourage innovation and high-caliber research have supported Japan's progress in digital transformation in higher education. Institutions are encouraged to build networks and partnerships, both domestically and internationally, to facilitate the exchange of ideas and knowledge in digital pedagogy and educational technology through programs like

the Inter-University Sharing Project. Government regulations and aggressive actions have been crucial in integrating digital technology into Japanese HEI. Japan has effectively utilized digital platforms to improve higher education teaching, research, and learning experiences by focusing on internationalization, enabling global cooperation, and supporting innovation (Islam & Alam, 2023).

Figure 8. Government Policies and Initiatives to Integrate Digital Technologies into Japanese Higher Education Institutions
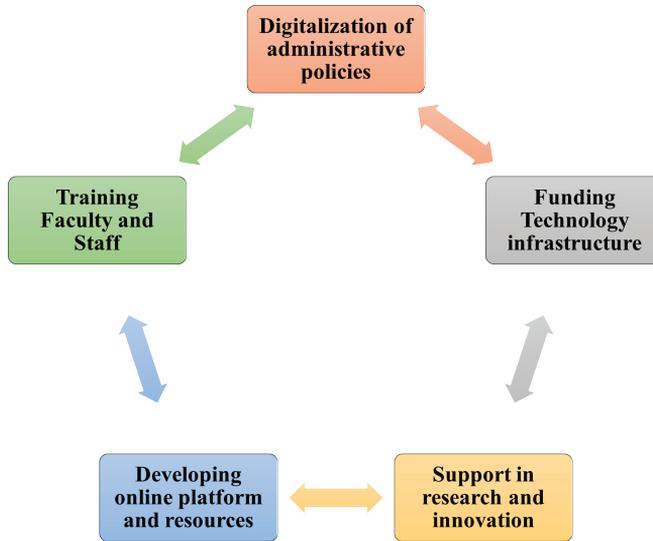
Source: Created by the Author Based on the Survey and Interview Data

Bangladesh can benefit from studying Japan's successful integration of digital technologies into its higher education system *(Figure 8)*. Japan has made significant investments in digital infrastructure, such as high-speed internet and powerful computer facilities, which Bangladesh may utilize to provide dependable internet and necessary technologies to all educational institutions. Comparable financial frameworks can be established to encourage the incorporation of digital instruments. Japan offers advanced online learning tools and resources that Bangladesh may utilize to enhance the accessibility of high-quality education, particularly in remote areas. Bangladesh can implement training programs to provide instructors with the essential skills for proficiently utilizing digital technology in education. Japan has fostered collaborations among the government, academia, and industry to spur innovation and integrate technology into education through Public-Private Partnerships. Bangladesh can contribute resources for research initiatives that address specific challenges and opportunities associated with using digital technology in education. Additionally, Bangladesh could

formulate policies that define goals, strategies, and guidelines for leveraging technology to improve educational outcomes and equity, mirroring Japan's robust legislative framework.

4.2.2 The Role of Public-Private Partnerships in Advancing Digital Innovation and Infrastructure Development

These initiatives aim to enhance transparency, accountability, and competitiveness within institutions by adopting digital technology and encouraging internationalization. MEXT's competitive financing programs have motivated universities to pursue digital innovation and infrastructure development by assessing institutions based on their proposals, objectives, plans, goals, and specific programs linked to digitalization and internationalization (Gong & Ribiere, 2021).

The introduction of Key Performance Indicators (KPIs) highlights the organized nature of these efforts, encouraging institutions to focus on achieving specific numerical targets to obtain funding. However, an overemphasis on KPIs can sometimes prioritize quantitative measures over comprehensive performance, potentially impacting the quality of education and the student experience. Successful participation in competitive finance initiatives can serve as a recruitment tool and enhance the reputation of institutions, thereby advancing digital innovation and infrastructure development. Public-private collaborations promote digital innovation and infrastructure development within Japanese higher education. Collaborating with private sector organizations allows universities to leverage advanced technology, expertise, and resources to boost their digital capabilities (Ferreira, 2019). Such partnerships aid in establishing high-quality English as a medium of instruction (EMI) programs, which are crucial for attracting international students and fostering global cooperation.

Furthermore, public-private partnerships help create facilities for Japanese language instruction to address the growing demand among international students. These institutions offer a range of language courses to support overseas students' access to education in Japan, encourage cultural exchange, and improve the global competitiveness of Japanese higher education. Japan has successfully navigated its digital revolution through initiative-taking measures, competitive financing projects, KPIs, and public-private partnerships. These efforts have driven digital innovation, infrastructure development, and internationalization at Japanese institutions, enhancing educational quality and encouraging global collaboration (Hossain, 2022).

Bangladesh boasts a strong history of public-private partnerships (PPPs) and could adopt similar approaches in its education sector. Japanese universities often

collaborate on joint research projects with businesses, utilizing corporate expertise and financial backing. Bangladesh may promote these partnerships by incentivizing collaborative research focused on digital innovation. Japan has established industry-academia collaboration centers to improve cooperation between academia and industry in developing digital technologies and infrastructure. Similar institutions could be established in Bangladesh to promote collaboration between industry and academia. Japanese universities offer internship programs that provide students with practical experience and industry insights. Bangladesh should consider creating joint degree programs with leading companies in the digital industry to address the demand for skilled talent. Japan provides financial support and incentives to facilitate collaboration between academic researchers and commercial entities. Bangladesh could allocate funding for Public-Private Partnerships (PPPs) in higher education while offering tax incentives or financial aid to encourage companies to partner with universities on digital innovation initiatives. Japan also supports entrepreneurs through startup incubators and technology licensing programs. Bangladesh has the chance to develop support networks to help university researchers market their inventions and advance the digital economy. Japanese universities routinely receive funding from the public and private sectors. To improve infrastructure, including laboratories and research facilities.

4.2.3 Japan's Efforts to Increase Equitable Participation in Digital Education Initiatives by Addressing Issues of Digital Literacy and Access

Japan has tackled digital literacy and access obstacles to encourage fair involvement in digital education programs through governmental efforts, especially in internationalization and study abroad programs. The government of Japan's dedication to expanding the number of Japanese students studying overseas has resulted in a substantial rise in cash designated for study abroad scholarships. Financial assistance has expanded the range of individuals participating in study abroad programs, guaranteeing that students from various socioeconomic backgrounds may engage in foreign educational opportunities. However, there is a disparity between the increasing number of Japanese students studying overseas and the skill requirements recognized by companies (Alam et al., 2024). Universities are encouraged to collaborate with government initiatives and create thorough programs that include students' whole enrollment period, from admission to graduation. This involves creating routes for progression connected to potential work or more education, guaranteeing that students receive comprehensive assistance throughout their academic experience.

Japan has effectively incorporated many overseas students into its higher education institutions. Japanese universities need to improve the worldwide

applicability and flexibility of their educational content, academic calendar systems, and language of teaching, for example, by implementing English Medium teaching (EMI) programs. The Japanese government has shifted its focus to supporting Japanese students studying abroad, acknowledging the significance of developing international human resources to enhance the performance of global companies. The policy shift has resulted in less support for international students in Japanese universities, which impacts these institutions' diversity and international perspective. Despite the efforts made, there are still difficulties in highlighting the globalization of Japanese higher education at the institutional level (Ahsan et al., 2022). Internationalization initiatives are frequently motivated by competition amongst local universities rather than a sincere focus on improving education for a worldwide society. Hence, it is urgent to prioritize the development of digital consciousness to guarantee that all students have equitable chances to participate in digital educational initiatives and contribute to the global knowledge economy.

5. Limitation of the Study

The current research has several intrinsic constraints due to its main emphasis on the digital transformation of Bangladesh's higher education system, particularly drawing insights from Japan. This comparative study primarily focuses on the countries under discussion, notably Bangladesh and Japan. The study's scope is limited by the contextual disparities between Japan and Bangladesh, which arise from their distinct geographical locations, educational frameworks, student demographics, financial capacities, and resources. The lessons learned from Japan might not apply to Bangladesh because of these differences. Due to constraints on time and money, the author only discussed Japan's recent digital transition. However, to address these long-term difficulties, Japan must exert significant effort. This study could be more productive if the historical neglect could be juxtaposed with the current situation in Bangladesh.

Moreover, regarding the intersection of education and digital advancement, this study focused on specific technologies, overlooking a broader perspective on their overall digital transformation process. A notable constraint of this paper is the restricted population size of individuals from Japanese universities compared to those from Bangladesh. The significance of the behavioral settlement can be enhanced by including the perspectives and ideas of additional stakeholders and policymakers.

6. Recommendations for Future Implications

The next phase of this project could involve examining Japan's strategies for digital innovation in HE, applied to Bangladesh, explicitly focusing on adapting to

the local environment, addressing implementation issues, and developing frameworks for assessing the impact. Furthermore, there is an opportunity to delve into domains of digital transformation that hold significant promise for Bangladesh. These domains include free educational resources, online learning platforms, and the application of gamification in education. A comparative analysis can be expanded by including more countries to evaluate the potential effects.

7. Conclusion

Bangladesh can take inspiration from Japan's successful digital transformation initiatives in higher education. Japan's strategy has been defined by its creative methods, focused financial investments, and dedication to improving educational outcomes. Bangladesh can obtain crucial insights to improve its digital transformation efforts by examining Japan's successful projects. Collaborative efforts among academia, industry, and government in Japan have fueled innovation, aligning education with societal and economic needs. Bangladesh can adopt this collaborative model by encouraging partnerships among universities, businesses, and policymakers. Japan's focus on personalized and adaptive learning methods has allowed students to interact with educational content designed for their specific needs and preferred learning styles. Bangladesh can consider implementing adaptive learning technologies and platforms to improve student experiences and bolster academic performance across varied demographics. Japan's investment in infrastructure and digital literacy programs has facilitated broad access to digital resources and technology-enhanced learning environments. Bangladesh should prioritize enhancing digital infrastructure and literacy for students, educators, and the general population. By leveraging Japan's experiences, Bangladesh can navigate existing challenges and capitalize on new opportunities to improve the quality, accessibility, and relevance of educational prospects. With strategic partnerships, innovative practices, and a dedication to ongoing improvement, Bangladesh can chart a transformative path towards a higher education landscape empowered by digital technology, equipping students with essential skills and knowledge for success in the evolving era.

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