Knowledge and Attitudes toward Education Board Directions during COVID-19: Evidence from Higher Secondary Students

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Abstract

Due to the impacts of COVID-19 on education worldwide, Bangladesh implemented a range of educational management measures, including online classes, television education programs, and teacher training in digital literacy. Students' perceptions in higher secondary education are important for evaluating the efficiency and resilience of education systems. To assess higher secondary students' knowledge of education board directives and their attitudes toward their implementation, a cross-sectional survey was conducted after COVID-19-related interventions ended. Knowledge was assessed through multiple-response items while attitudes were measured on a five-point Likert scale. Descriptive statistics (frequencies, means, SD) were used for analysis. Additionally, subgroup analyses were conducted to examine whether knowledge and attitudes differed by sex, district, area of residence, and type of college. Knowledge was highest for directives on Google Meet-based classes, attendance monitoring, and awareness creation. Awareness of reporting absenteeism and observing non-attendance was relatively low. Attitudes were mixed; students acknowledged college initiatives and teacher monitoring but reported low engagement and interest. According to the statistical test, there were no significant differences between males and females, but differences were found in attitudes toward attention, engagement, and monotony. Both knowledge awareness and attitudes toward teachers' monitoring and institutional initiatives varied significantly across districts, areas of residence, and types of college. Although the students were aware of the structural instructions, they reported lower satisfaction with engagement and motivation. Maintaining the continuity and quality of education, teachers' training, consistent monitoring, and digital equity should be included in policies for managing future crises in the education sector.

Keywords: Bangladesh, Higher Secondary Education, COVID-19, Education Board, Online Learning, Student Attitudes, Knowledge

1. Introduction

Bangladesh adopted online teaching and learning models for educational management, and the COVID-19 pandemic brought global changes in the delivery of education (Shohel et al., 2022). These authors also noted that low digital literacy, resource constraints, and inadequate ICT infrastructure posed significant challenges to the transition to online teaching and learning in Bangladesh. Adaptation remained challenging due to teachers' training, poor socioeconomic conditions, disruptions, limited access to the internet and electricity, a lack of ICT equipment, and limited exposure to technology (Arefin et al., 2023).

Online education also faced challenges due to a lack of preparedness and participation, limited scope for classroom activities, disruptions to internet and electricity services, and limited attention and understanding of lessons. However, there was a difference between urban and rural students regarding regularity and attention in online classes. Because urban students had greater access to electronic devices, separate reading rooms, etc., they derived greater benefits from online classes than rural students (Al-Amin et al., 2021). Although learning and teaching in Bangladesh's education system are strongly correlated, this was demonstrated by the COVID-19 pandemic (Gazi, 2023).

On the other hand, digital and infrastructural limitations made it difficult for students from low-income and rural households to engage with remote learning platforms. Researchers (Naureen,

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2025, and Aman et al., 2019) pointed out that differences in the context of rural and urban areas' access to digital opportunities were shaped by the socioeconomic status of the students and their parents' educational background, which directly influence participation and outcomes, although ownership of devices improves participation and decreases academic issues. Yanlin & Royo (2024) and Graves et al. (2021) noted that rural students struggled to access technological opportunities and guidance from their institutions, compared with their urban counterparts. This transition was affected by limited access to financial support, low levels of digital literacy, and inadequate internet connectivity and physical and virtual infrastructure, although it opened new opportunities for educators and various practitioners in the context of professional development (Shohel et al., 2022). However, uneven infrastructure alone cannot explain these gaps; students' surrounding environments also create barriers to access to technological facilities and to learning outcomes (Saleh et al., 2023). Despite national institutional efforts during COVID-19, inequalities in rural students' access to and availability of devices reduced attendance in online classes, resulting in lower performance (Arefin et al., 2023; Liu, 2021). Additionally, the COVID-19 pandemic also increased psychological and health-related issues (Hoque et al., 2021).

A Heliyon qualitative study on pandemic schooling in Bangladesh documented that the curriculum, assessment, teaching, and learning methods had changed due to the pressure of the COVID-19 pandemic, resulting in an increase in the use of the online education system, and the government changed the education policy to adapt (Alam et al., 2022). However, Noor & Shaoun (2021) suggested that effective and inclusive online teaching and learning be implemented for all students. Taken together, these results suggest that directive awareness alone is insufficient without credible assessment and well-defined interaction.

Studies on students in Bangladesh found demographic and contextual arbitrators in line with the present research's focus on district, area of residence, and college type. For instance, Mia (2022) found that there was a gap among students regarding capability level in digital learning technology and online learning method and assessment system supportive environment, except for differences between male and female, as well as Naomee (2022) added that most of the challenges in online learning are found due to infrastructural and economic condition, teacher and student relationship, and their mental happiness. However, Karim et al. (2025) suggested that improvements in infrastructure, the development of faculty training programs, and the adoption of AI-based assessment methods are practical solutions to these challenges. These findings are consistent with the aims of this study and help inform recommendations on both attitudes and knowledge to guide the Education Board's sustainable implementation policies.

Taken together, prior work suggested that while directives existed, their classroom implementation and students' experiences varied widely across contexts. However, evidence focusing specifically on higher secondary students' knowledge of post-COVID education board directives and their attitudes toward the quality of implementation remains limited.

The present study, therefore, bridges a critical gap by exploring higher secondary learners' awareness of the education board directives, their attitudes towards their implementation, and the demographic variations in these perceptions. By situating these insights within the context of national post-pandemic educational reforms, the study contributes to a better understanding of how macro-level policy decisions are reflected in micro-level learning experiences.

2. Objectives

This study has three specific objectives. First, it seeks to identify higher secondary students' understanding and perceptions of board directions in education, online attendance management, and the management of education in Bangladesh following the end of COVID-19. Second, it aims to assess students' attitudes toward implementing such instructions at the institutional and classroom levels. Third, it examines differences in knowledge and attitudes based on demographic factors, including sex, district, area of residence, and type of college.

3. Research Questions

In line with these objectives, the study addresses the following research questions:

RQ1: What is the level and pattern of higher secondary students' knowledge of education board directions in the post-COVID context?

RQ2: How do higher secondary students perceive and evaluate the implementation of these directions in terms of interest, engagement, and institutional monitoring?

RQ3: Do students' knowledge and attitudes toward education board directions differ significantly by sex, district, area of residence, and type of college?

4. Literature Review

The COVID-19 pandemic required a sudden shift in Bangladesh's education system to an emergency remote model, in which synchronous platforms such as Google Meet and Zoom played a significant role. The early rollout of these online guidelines generated widespread awareness but minimal consistency in implementation. Research shows that although students rapidly learned the online class conditions and attendance standards, their sustained monitoring, feedback, and interaction were very poor (Alom et al., 2023; Al-Amin et al., 2021). These results concur with the current study, which found that most learners interpreted the guidelines on the Education Board's website but believed there was little faculty follow-through and enforcement. Similar data from South Asia have shown that the initial period of the online shift was driven by enabling conditions, technology readiness, learning experiences, mental health conditions, and performance development and sustainability-related concerns, rather than pedagogy and motivation (Saleh et al., 2023).

Digital readiness and preparedness in Bangladesh's online learning scenario have emerged as key factors in success. Al-Amin et al. (2021) reported that tertiary students lacked devices, preparedness, stable internet connectivity, and prior experience with online learning. Alom et al. (2023) further found that it was not simply the use of the platform that ensured effective learning, but rather teacher-facilitated approaches (structured questioning, pace breaks, and interactive tools) that sustained engagement. Shohel et al. (2025) and Hossain (2023) highlighted that the elements of sustainable digitalization in higher education include positive engagement of teachers and students, a cost-effective blended learning policy, the incorporation of blended learning into the curriculum, and cohesive digital policy frameworks.

Student engagement and motivation were the worst link in online teaching during the pandemic. Evidence from classes at the secondary and higher-secondary levels revealed that online classes faced challenges due to dwindling interest and participation, lack of devices among teachers, limited interaction, financial and technological hardships, etc., as the novelty wore off and lecture-based delivery took over (Rouf & Rashid, 2021). Qualitative research reports highlighted unforeseen disruptions to the learning process and complications associated

with online education, particularly in practical and laboratory-based learning and in ineffective two-way interaction, particularly among students in resource-constrained conditions (Saha et al., 2023). Gautam & Gautam (2021) and Saleh et al. (2023) illustrated similar trends among neighboring countries, with the quality of engagement and the effectiveness of the online mode depending on technological infrastructure, teacher readiness, learning experiences, mental health, and students' self-discipline and perceptions. These patterns align with the findings of this study, which showed that learners perceived online lessons as monotonous and less stimulating than in-person instruction. Institutional support and monitoring had a greater influence on learners' satisfaction than any individual technological factor. Chowdhury et al. (2024) noted that having sufficient institutional facilities, technical help desks, organizational schedules, learning management systems, and similar resources would have a significant impact on satisfaction. These findings indicate that monitoring cannot play a role in achieving slight to effective engagement due to ineffective attendance tracking and the absence of institutional or technical support, as discussed in the present study.

Online learning became more complex due to the digital divide and socioeconomic disparities. Studies (Naureen, 2025; Al-Amin et al., 2021; Khan et al., 2020; and Aman et al., 2019) found that learners who live in cities with high socioeconomic status and improved internet connection and ownership of digital devices report consistent positive experiences, although e-learning has appeared as a new method of enhancing the learning process. Shohel et al. (2024) stated that due to social distancing and quarantine measures, students and teachers experienced a radical change in educational methods. The ease of using technology and institutional support affect the behavioral intentions of both students and teachers who adopt and implement blended learning. Taken together, these findings present a pattern in which consistent infrastructural facilities and accessibility enable participation; teacher design and assessment transform participation into engagement; and institutional governance provides motivation. Online education in Bangladesh shows high awareness but poor outcomes due to an uneven distribution of resources, periodic pedagogy, and limited institutional support. The literature, therefore, places the findings of this study in a wider regional context-one where Bangladesh achieved considerable connectivity and awareness gains but continues to suffer from systemic problems of engagement, inclusion, and instructional quality in the post-pandemic period.

4.1. Theoretical Foundation

This study adopts an integrative conceptual framework that brings together elements from the Knowledge–Attitude–Practice (KAP) approach, multi-level educational governance perspectives, technology acceptance, e-learning research, and digital divide literature. The framework is tailored to the post-COVID context in Bangladesh, specifically for higher secondary learners.

Firstly, the KAP tradition provides a fundamental logical framework for understanding what learners know, how they feel, and how they are likely to behave. Research on KAP paradigms generally examines the influence of knowledge (about a specific problem) on attitudes (and, consequently, the so-called practices) that are reported or intended to be performed (Kaliyaperumal, 2004). The directions of education boards during and after COVID-19 are considered the main informational input in this study, and the knowledge of students is that which involves their awareness and memory of a particular rule and guideline (e.g. whether they felt an engaging online class, whether it was just or tedious, etc.), and the attitudes of students are linked to the way they evaluated and felt about how these directions were enacted within the educational setting (e.g. did they enjoy the resulting online classes, did they feel the classes were fair, etc.). Even though this work does not quantify the concept of practice in its

specific behavioral sense, the levels of interest, engagement, and perceived effectiveness reported by students are treated as close proxies for the extent to which policy directives are translated into meaningful participation in learning.

Second, the framework is explicitly multi-level. Based on the teaching perspective and educational approaches, or phenomenological approach to education proposed by Bray & Thomas (1995), which suggests that the idea of education boards can be considered as macro-level policy input, college and teacher behavior as meso-level implementation operation, and student experiences as micro-level outcome, this research proposes conceptualizing education board directions as macro-level policy input, college and teacher behavior as meso-level implementation mechanisms, and student experiences as micro-level outcomes. At the macro level, the boards of secondary and higher education provide guidance on online teaching, attendance organization, and observation. At the meso level, these directives are perceived and implemented by colleges through schedules, platforms, monitoring systems, and teacher support. At the micro level, students perceive and learn from these decisions as tangible experiences in online or blended learning, which shapes their understanding of the rules and their perceptions of their implementation. This macro-meso-micro perspective helps situate individual students' perceptions within broader governance patterns rather than treating them as isolated opinions.

Third, the field of research on technology acceptance and e-learning advances the framework's explanation of the correlation between knowledge of directions and attitude towards implementation. According to the Technology Acceptance Model (TAM) and its brethren, attitudes and intentions to use a given system are highly influenced by perceived usefulness and perceived ease of use, as well as users' beliefs (Davis, 1989). E-learning scholarship also identifies course quality, instructor support, technology quality, and learner characteristics as significant determinants of satisfaction and engagement (Sun et al., 2008). As applied to this study, these strands imply that despite the fact that it is likely that the students are well informed about the rules of the board (high knowledge), only positive attitudes will result when the online or blended arrangements put in place are viewed as useful, easy, supportive, and pedagogically stimulating. That is, the necessary and sufficient condition for positive engagement is directive awareness; the impressions of the quality of instruction and the technological usability are the key mediators.

Fourth, digital divide perspectives can help explain why knowledge and attitudes differ across districts, areas of residence, and types of college. Digital divide studies indicate that access, skill, usage, and outcome disparities are structured along socio-economic and geographic lines and are not binary (Selwyn, 2004). In Bangladesh, such divisions overlap with the broader problems in rural and urban settings and between governmental and non-governmental institutions. Thus, the framework considers sex, district, residence, and type of college as contextual moderators that may influence students' opportunities to use online learning, as well as their views on the quality and equity of implementation.

Lastly, the framework is grounded in new empirical studies of learners in higher secondary schools in Bangladesh during COVID-19. Rahman et al. (2023) found that challenges and difficulties influence higher secondary students' perceptions of online learning, perceived effectiveness, and motivation, despite learners generally indicating a positive attitude toward online education. Hossain (2023) demonstrated that higher secondary level blended learning in Bangladesh was associated with structural barriers of infrastructure, institutional preparedness, and learner preparedness, and opportunities of flexible learning when properly facilitated. Collectively, these studies suggest that policy-level measures to online and blended learning

should be construed with the prisms of institutional capacity, technological circumstances, and student motivation, all of which are included in the current framework.

To conclude, the conceptual framework takes the directions of education boards as macro-level inputs, filters them at the meso-level through institutional practices, and manifests them at the micro-level in students' knowledge and attitudes. The study applies multilevel educational analysis (Bray & Thomas, 1995), the technology acceptance model (Davis, 1989), the e-learning model (Sun et al., 2008), and digital divide perspectives (Selwyn, 2004).

5. Methods

5.1 Research Design

This study employed a cross-sectional descriptive survey design to investigate higher secondary-level students' knowledge and attitudes toward education board directives in the post-COVID context of Bangladesh, as this design is well-suited to capturing perceptions and self-reported behaviors at a single point in time across a relatively large group of respondents.

5.2 Participants and Setting

A total of 390 higher secondary students were surveyed in 2022. Respondents were drawn from multiple institutions, representing diverse socioeconomic and geographic contexts across Bangladesh.

A multi-stage sampling strategy was used. First, three districts (Mymensingh, Cox's Bazar, and Chapainawabganj) were purposively selected to represent diverse geographic and socioeconomic contexts. Second, within each district, both government and private colleges were included to ensure institutional variation. Third, within the selected colleges, students from relevant higher secondary classes were approached using proportionate stratified sampling by sex and, where feasible, by residence. This approach was adopted to obtain a balanced sample that could support subgroup comparisons while remaining feasible within the project's time and resource constraints.

5.3 Instruments

A structured questionnaire was developed based on the directions from the education board and previous related literature. Thus, the structured questionnaire contains two major sections:

1. **Items on knowledge (Multiple responses):** Awareness of students regarding the directions from the education board on the issues of Google Meet classes' facilitation, creation of awareness, reporting of absence, and ensuring attendance.

2. **Items on attitude (based on Likert Scale):** The directions from the education board and practices rated by the students on a 5-point Likert Scale, where 1= strongly disagree, and 5= strongly agree on students' interest in the directions from the education board, monotony reduction, active engagement, attendance monitoring, and initiatives taken by institutions.

By mapping the items against the conceptual framework (knowledge, attitude, and contextual moderators) and aligning with the official directions of the education board, the structured questionnaire was developed. Expert faculty members in education and social research validated that the questionnaire items were relevant, strong, clear, and appropriate for higher secondary students. A pilot study was conducted with 20 learners to ensure the wording, response options, and layout for data collection.

5.4 Collection of Data

To maintain national COVID-19 safety requirements, the data for this study were collected in 2022 by administering a printed questionnaire to participants, with trained research assistants in classrooms that maintained physical distancing and required masks. To ensure security and protection, some data were collected using the same instrument by students under the guidance of class teachers, without affecting responses. This blended data-collection procedure ensured high engagement.

All ethical issues were considered from different perspectives. Before participating, students were informed of the research's purpose, the voluntary nature of their involvement, and their right to refuse or withdraw at any time without academic consequences. All respondents gave informed consent, and no personal data (names or roll numbers) was included in the dataset. The questionnaires were kept in a safe place and utilized during the research.

5.5 Data Analysis

Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to answer RQ1 and RQ2 by summarizing patterns of knowledge and attitudes. To assess the internal consistency of the attitude scale and determine whether it warranted aggregation into an overall attitude measure, Cronbach's alpha was calculated. For RQ3, chi-square tests were used to assess the association between the demographic variables (categorical) and the knowledge indicators, whereas independent-samples t-tests and one-way ANOVA were used to compare the mean scores of the attitude variables between groups. These steps were chosen because they are suitable for examining the associations between categorical and continuous variables in survey data.

6. Results

6.1 Knowledge of Education Board Directions (RQ1)

Table 1 presents students' knowledge of the education board directions. Awareness was highest for "conducting classes via Google Meet" (82.05%), followed by "ensuring attendance" (74.10%) and "awareness creation" (71.28%). In contrast, fewer students identified "reporting absenteeism to the education board" (37.17%) or "actively observing non-attendance" (26.41%).

This suggests that while digital platform use and attendance monitoring were widely recognized, reporting and enforcement mechanisms were less salient to students.

Table 1. Knowledge of education board directions (n = 390)

Education Board Direction	Frequency	Percentage (%)
Conduct classes via Google Meet	320	82.05
Awareness creation	278	71.28
Reporting absenteeism to the education board	145	37.17
Ensure attendance in class	289	74.10
Actively observing students' non-attendance	103	26.41

This bar chart displays the percentage of students aware of different education board directives in the post-COVID context. Awareness was highest for conducting classes via Google Meet (82.05%) and ensuring attendance (74.10%), followed by awareness creation (71.28%). Fewer

students reported knowledge of absentee reporting (37.17%) and active observation of non-attendance (26.41%).

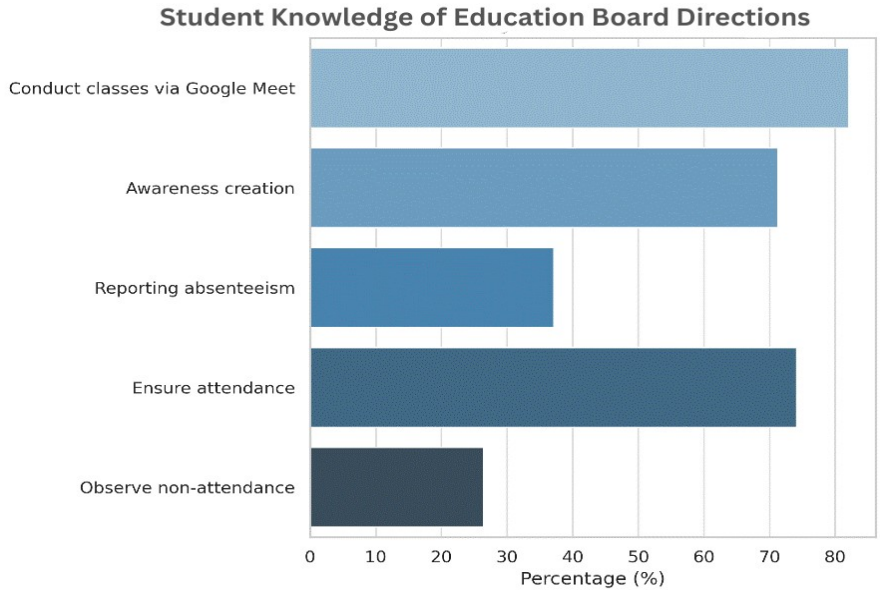


Figure 1. Student knowledge of the education board directions

6.2 Attitudes toward Education Board Directions (RQ2)

Students' attitudes are summarized in Table 2. Ratings were mixed. The highest mean scores were observed for "college taking initiatives to improve performance" (M = 3.35, SD = 1.12) and "monitoring of attendance by teachers" (M = 3.15, SD = 1.07). Use of Google Meet for connection was moderately rated (M = 3.30, SD = 1.29). Lower ratings were observed for "directions reducing boredom" (M = 2.40, SD = 1.19) and "directions creating interest" (M = 2.78, SD = 1.18). The overall mean attitude score was M = 2.91 (SD = 1.39).

These results indicate that students recognized institutional monitoring efforts but felt less engaged or interested in the directions themselves.

Table 2. Students' attitudes toward education board directions (n = 390)

Statement	Mean	SD
Directions created interest	2.78	1.18
Directions reduced boringness	2.40	1.19
Students are actively engaged in class	2.70	1.23
Students connected with Google Meet	3.30	1.29
Teachers monitored student attendance	3.15	1.07
The college took initiatives for student performance	3.35	1.12
Overall Attitude	2.91	1.39

This table illustrates mean scores (1 = Strongly Disagree, 5 = Strongly Agree) of student attitudes. The highest-rated items were college initiatives for improving student performance (M = 3.35) and teacher monitoring of attendance (M = 3.15). Moderate scores were observed for connection via Google Meet (M = 3.30). Students rated engagement (M = 2.70), interest

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(M = 2.78), and reduced boredom (M = 2.40) as relatively low, suggesting a weaker, less effective, and less motivational impact of the directions.

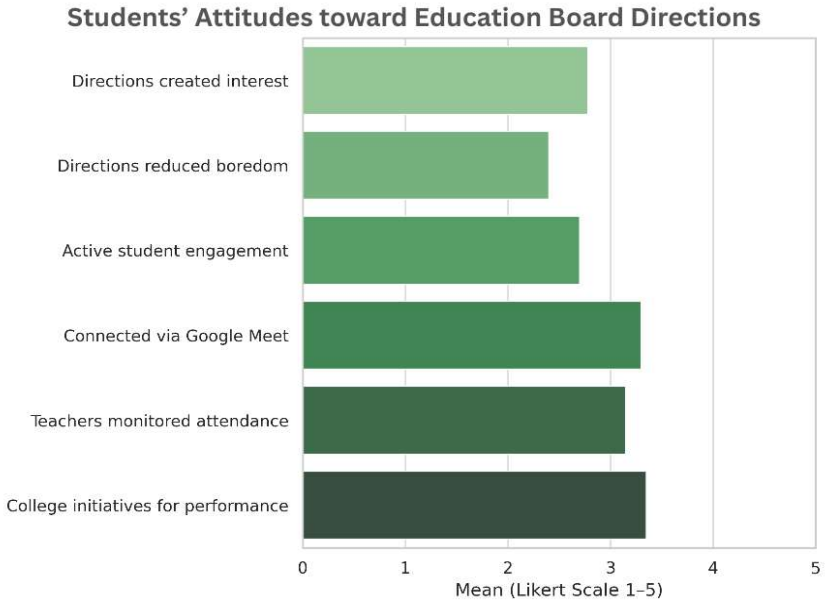


Figure 2. Students' attitudes toward the education board directions

6.3 Demographic Differences in Knowledge and Attitudes (RQ3)

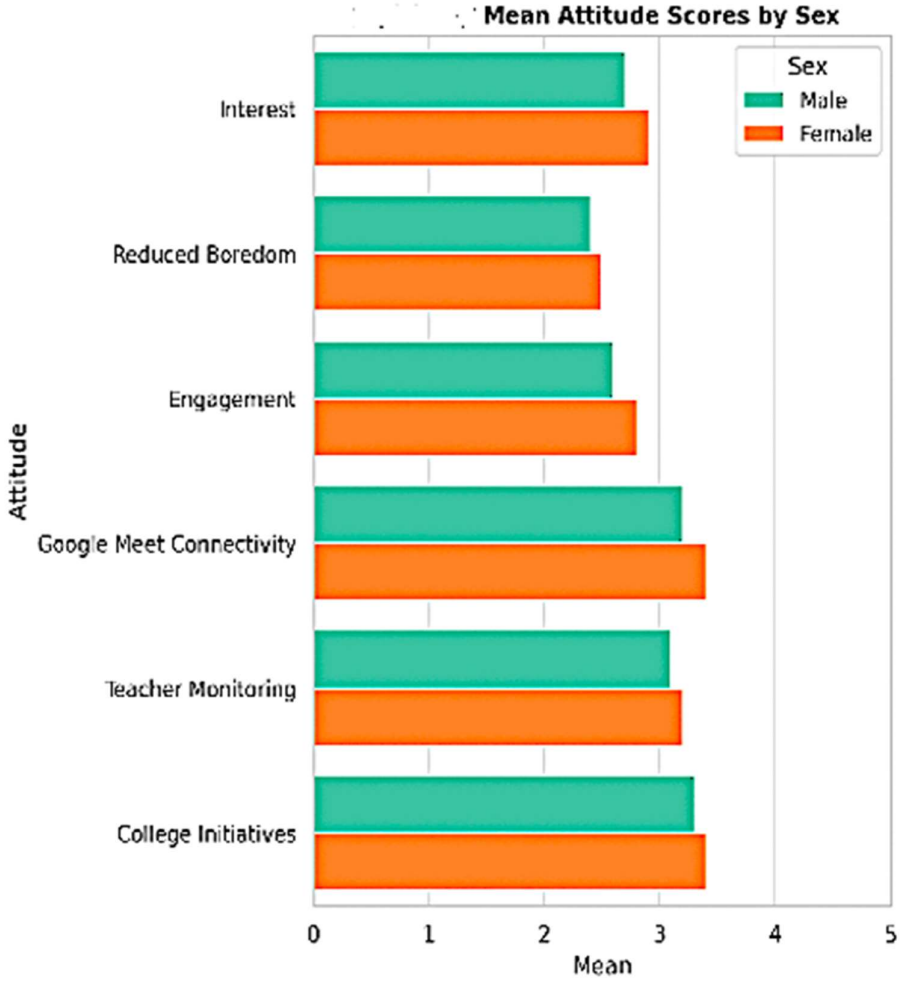
Slightly more than half of the participants were male (55.1%), while females represented 44.9% of the sample. Respondents were evenly distributed across the three districts (Mymensingh, Cox's Bazar, and Chapainawabganj), with each contributing 33.3% of the sample. Similarly, students from rural, semi-urban, and urban areas were equally represented (33.3% each), ensuring balanced geographical coverage. Regarding institutional type, a slightly larger proportion of students attended government colleges (53.8%) compared to private colleges (46.2%). This balanced distribution across sex, district, and residence strengthens the sample's representativeness, while the slight majority from government colleges reflects the wider prevalence of such institutions in Bangladesh.

Table 3. Demographic characteristics of respondents (n = 390)

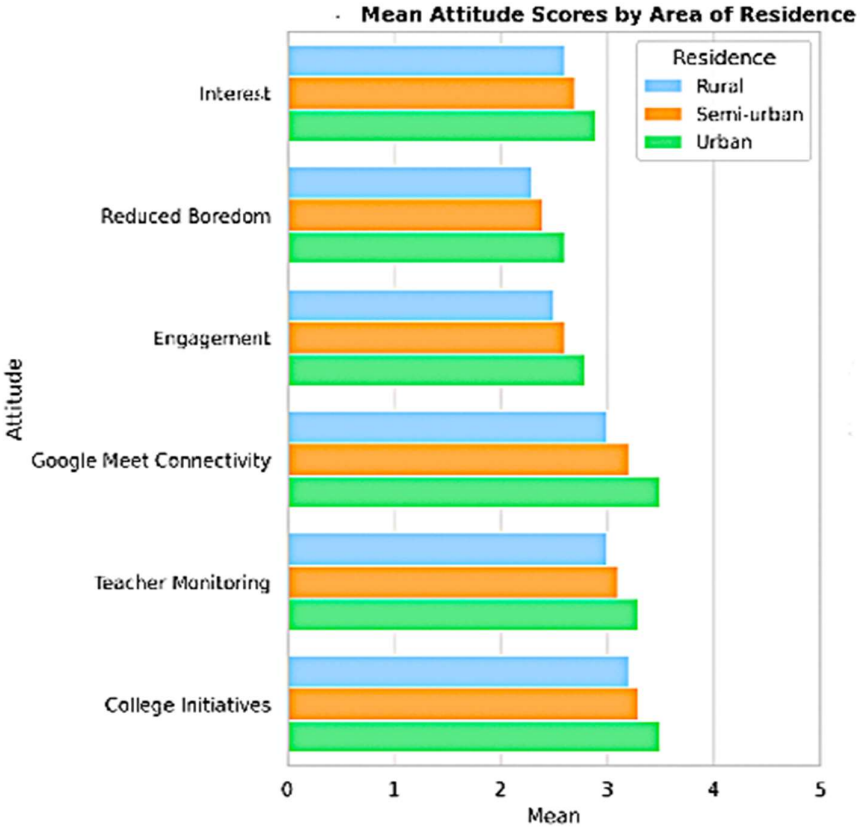
Variable	Category	Frequency	Percent
Sex	Male	215	55.1
	Female	175	44.9
District	Mymensingh	130	33.3
	Cox's Bazar	130	33.3
	Chapainawabganj	130	33.3
Area of Residence	Rural	130	33.3
	Semi-urban	130	33.3
	Urban	130	33.3
Type of College	Government	210	53.8
	Private	180	46.2

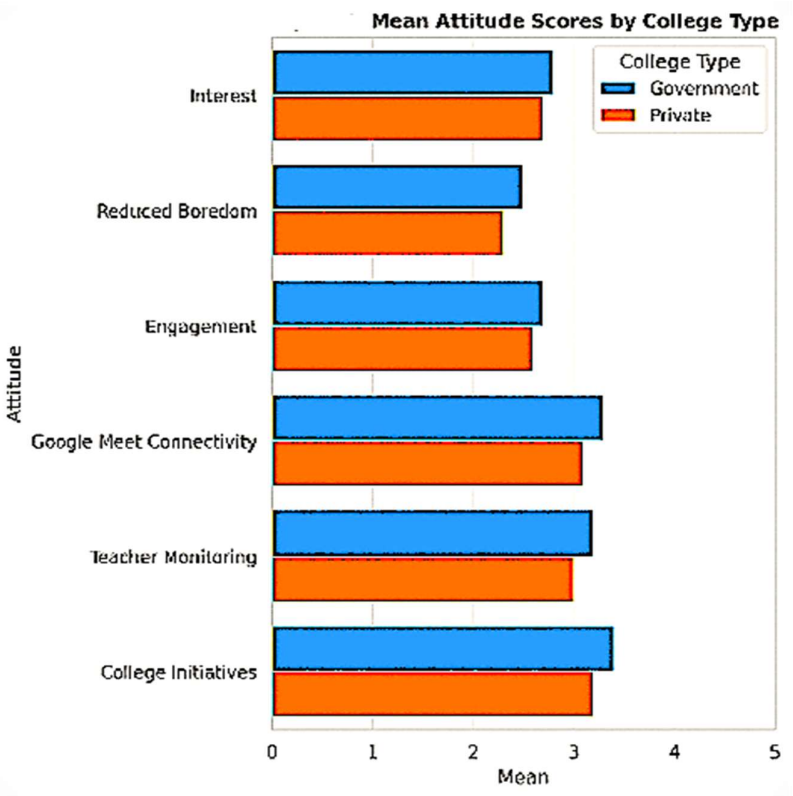
Source: Field survey, 2022

Statistical analyses revealed that sex was not significantly associated with either knowledge or attitudes toward board directions. District-level differences were modest, with students from urban districts reporting slightly higher awareness of absentee monitoring ($p < .05$). Area of residence also showed variation, as urban students expressed more favorable attitudes toward Google Meet connectivity than rural students ($p < .05$). Type of college influenced certain perceptions: students from government colleges rated teacher monitoring significantly higher than those from private colleges ($p < .05$).



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Figures 3, 4, and 5. Mean attitude scores by sex, residence, and college type

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6.3.1 Chi-square tests: Knowledge Differences by Demographic Variables

Chi-square tests of independence were conducted to examine awareness of the education board's directions, which varied significantly by gender, district, area of residence, and type of college. Knowledge of each education board direction was coded as a binary variable (not aware vs. aware). Table 4 presents the results.

Table 4. Chi-square test results for knowledge regarding the direction from the education board by demographic variables (n = 390)

Knowledge Item	Demographic Variable	χ^2	*df*	*p*
Conduct classes via Google Meet	Sex	0.187	1	.665
	District	6.233	2	.044*
	Area of Residence	6.233	2	.044*
	College Type	0.357	1	.550
Awareness creation	Sex	0.694	1	.405
	District	8.236	2	.016*
	Area of Residence	8.236	2	.016*
	College Type	10.318	1	.001*
Reporting absenteeism	Sex	0.713	1	.399
	District	1.664	2	.435
	Area of Residence	1.664	2	.435
	College Type	2.088	1	.148
Ensure attendance in class	Sex	0.004	1	.950
	District	13.462	2	.001*
	Area of Residence	13.462	2	.001*
	College Type	12.962	1	.000*
Actively observe non-attendance	Sex	0.000	1	1.000
	District	3.168	2	.205
	Area of Residence	3.168	2	.205
	College Type	0.000	1	1.000

*Note. Mym = Mymensingh; Cox = Cox's Bazar; Chap = Chapainawabgonj. * $p < .05$*

Results show that, regarding knowledge of the education board's directions, gender was not significantly associated. However, district was significantly associated with that knowledge $\chi^2(2) = 8.236$, $p = .016$ and ensure attendance in class, $\chi^2(2) = 13.462$, $p = .001$. Moreover, the area of residence aligned perfectly with the district, resulting in an indistinguishable pattern. On the other hand, the type of college had a significant association with the knowledge regarding the directions of the education board, $\chi^2(1) = 10.318$, $p = .001$, and ensured attendance in class, $\chi^2(1) = 12.962$, $p < .001$, while the students of government colleges showed

higher awareness in comparison to the students from private colleges. Knowledge regarding absence and non-attendance did not differ significantly across demographic variables.

6.3.2 Independent Samples t-tests: Attitude Differences by Gender and Type of College

Independent samples t-tests were conducted to compare mean attitude scores between male and female students and between the students from government and private colleges, where Levene's test indicated unequal variances *($p < .05$)* and Welch-corrected t-values were used. Table 5 presents the results.

Table 5. Independent samples t-test results for attitude scores by sex and type of college (n = 390)

Attitude Item	Factor	Group 1 M (SD)	Group 2 M (SD)	t	df	p
Directions created interest	Sex	Male: 2.62 (1.04)	Female: 2.96 (1.55)	-2.588*	388	.010*
Connected via Google Meet	Sex	Male: 3.22 (1.35)	Female: 3.40 (1.56)	-1.231	388	.219
Reduced boringness	Sex	Male: 2.53 (1.43)	Female: 2.23 (1.43)	2.105*	388	.036*
Students actively engaged	Sex	Male: 2.62 (1.32)	Female: 2.30 (1.27)	2.465*	388	.014*
Teachers monitored attendance	Sex	Male: 3.27 (1.44)	Female: 3.00 (1.49)	1.778	388	.076
College took initiatives	Sex	Male: 3.41 (1.38)	Female: 3.28 (1.43)	0.938	388	.349
Overall Attitude	Sex	Male: 2.95 (1.05)	Female: 2.86 (1.08)	0.782	388	.435
Directions created interest	College Type	Govt: 2.69 (1.30)	Private: 2.87 (1.31)	-1.330	388	.184
Connected via Google Meet	College Type	Govt: 3.36 (1.48)	Private: 3.23 (1.41)	0.841	388	.401
Reduced boringness	College Type	Govt: 2.46 (1.47)	Private: 2.33 (1.40)	0.887	388	.376
Students actively engaged	College Type	Govt: 2.60 (1.40)	Private: 2.33 (1.18)	2.015*	388	.045*
Teachers monitored attendance	College Type	Govt: 3.17 (1.48)	Private: 3.12 (1.46)	0.298	388	.766
College took initiatives	College Type	Govt: 3.37 (1.42)	Private: 3.33 (1.39)	0.267	388	.790
Overall Attitude	College Type	Govt: 2.94 (1.13)	Private: 2.87 (0.98)	0.656	388	.512

*Note. Govt = Government college. M = Mean; SD = Standard Deviation. * p< .05. For 'Directions created interest' by sex, Levene's test was significant (F = 49.811, p < .001); Welch-corrected degrees of freedom were applied. For 'Students actively engaged' by college type, Levene's test was significant (F = 4.937, p = .027); Welch-corrected degrees of freedom were applied.*

Statistically significant differences were found in the direction of the education board-created interest regarding sex, $t(388) = -2.588$, $p = .010$, with females showing a higher mean (M = 2.96, SD = 1.55) than males (M = 2.62, SD = 1.04). In reducing boredom, significant differences were found (388) = 2.105, $p = .036$, and in active engagement $t(388) = 2.465$, $p = .014$, with male students showing higher scores on both items. However, in overall attitude, there was no significant difference by sex, $t(388) = 0.782$, $p = .435$.

In the context of college type, students from government colleges showed significantly higher active engagement scores *t(388) = 2.015*, *p = .045*) than students from private colleges. Although no other attitude items varied significantly in the context of type of college, there were comparable scores found regarding overall scores between the students from government colleges (M = 2.94, SD = 1.13) and private colleges (M = 2.87, SD = 0.98), *t(388) = 0.656*, *p = .512*.

6.3.3 One-way ANOVA: Attitude Differences by District and Area of Residence

To compare mean attitude scores across the Mymensingh, Cox's Bazar, and Chapainawabgonj districts and rural, semi-urban, and urban residential areas, a one-way ANOVA was conducted. Table 6 presents the results.

Table 6. One-way ANOVA results for attitude scores by district and area of residence (n = 390)

Attitude Item	Factor	Group Means M (SD)	F	df	p
Directions created interest	District	Mym: 2.82(1.32); Cox: 2.68(1.29); Chap: 2.82(1.32)	0.434	2, 387	.648
Connected via Google Meet	District	Mym: 3.38(1.42); Cox: 3.25(1.46); Chap: 3.28(1.47)	0.289	2, 387	.749
Reduced boringness	District	Mym: 2.31(1.31); Cox: 2.45(1.53); Chap: 2.44(1.47)	0.381	2, 387	.684
Students actively engaged	District	Mym: 2.46(1.26); Cox: 2.52(1.39); Chap: 2.45(1.27)	0.125	2, 387	.882
Teachers monitored attendance	District	Mym: 2.92(1.39); Cox: 3.48(1.51); Chap: 3.03(1.46)	5.479	2, 387	.005*
College took initiatives	District	Mym: 3.18(1.36); Cox: 3.63(1.41); Chap: 3.25(1.40)	3.958	2, 387	.020*
Overall Attitude	District	Mym: 2.84(1.06); Cox: 3.00(1.09); Chap: 2.88(1.04)	0.805	2, 387	.448
Directions created interest	Residence	Rural: 2.82(1.32); Semi: 2.68(1.29); Urban: 2.82(1.32)	0.434	2, 387	.648
Connected via Google Meet	Residence	Rural: 3.38(1.42); Semi: 3.25(1.46); Urban: 3.28(1.47)	0.289	2, 387	.749
Reduced boringness	Residence	Rural: 2.31(1.31); Semi: 2.45(1.53); Urban: 2.44(1.47)	0.381	2, 387	.684
Students actively engaged	Residence	Rural: 2.46(1.26); Semi: 2.52(1.39); Urban: 2.45(1.27)	0.125	2, 387	.882
Teachers monitored attendance	Residence	Rural: 2.92(1.39); Semi: 3.48(1.51); Urban: 3.03(1.46)	5.479	2, 387	.005*
College took initiatives	Residence	Rural: 3.18(1.36); Semi: 3.63(1.41); Urban: 3.25(1.40)	3.958	2, 387	.020*
Overall Attitude	Residence	Rural: 2.84(1.06); Semi: 3.00(1.09); Urban: 2.88(1.04)	0.805	2, 387	.448

*Note. Mym = Mymensingh; Cox = Cox's Bazar; Chap = Chapainawabgonj; Semi = Semi-urban. M = Mean; SD = Standard Deviation. * p < .05.*

Results show significant differences for teachers' monitored attendance in the context of district F(2, 387) = 5.479, *p = .005*, and for initiatives taken by the colleges for student performance, F(2, 387) = 3.958, *p = .020*. Students from Cox's Bazar showed that teachers who monitored attendance had significantly higher attendance than in Mymensingh (mean difference = 0.561,

$p < .05$) and Chapainawabgonj (mean difference = 0.454, $p < .05$), according to post-hoc comparisons. The same case was found in the context of the initiatives taken by the colleges where students from Cox's Bazar showed higher scores than Mymensingh students (mean difference = 0.454, $p < .05$). No other attitude items differed significantly by district, and the overall attitude did not differ significantly across districts, $F(2, 387) = 0.805$, $p = .448$.

Although the sample was designed by the district and area of residence, the ANOVA results for area of residence are structurally identical to those for district. Students from a semi-urban area showed higher mean scores for teachers' monitored attendance ($M = 3.48$, $SD = 1.51$) and college-initiated initiatives ($M = 3.63$, $SD = 1.41$) than students from rural and urban areas. However, overall attitude did not differ significantly by area of residence, $F(2, 387) = 0.805$, $p = .448$.

7. Discussion

7.1 Knowledge of Education Board Directions

The results highlight that the students were most aware of the education board's directions regarding online classes via Google Meet, attendance, and awareness campaigns. Though fewer students reported knowledge of remarking absence or active monitoring of absence. This trend suggests that although the board's policy-level instructions reached students, the implementation mechanisms were not visible.

The results of this study support other studies (Naureen, 2025, and Gazi, 2023) that highlighted the uneven dissemination of the education board's directives across all institutions in Bangladesh, and that reporting and monitoring mechanisms frequently failed to function efficiently in rural settings and resource-restrained environments. Therefore, awareness does not translate into consideration of all aspects of the application.

The RQ3 subgroups analysis also enhances these results. Although there was no major difference regarding sex, except in the district and residential aspects. The urban students were more aware of monitoring absence and had more positive attitudes toward online connectivity, suggesting that better outcomes were enabled by infrastructural and contextual advantages. It was also found that students in government colleges had stronger perceptions of teacher monitoring and institutional initiatives. These differences highlighted that the directions from the education board were not uniformly implemented among students, and that equity in digital and pedagogical resources was problematic.

7.2 Attitudes toward Implementation

The students' attitudes revealed that they recognized institutional initiatives and the teacher's monitoring role, but they showed lower satisfaction with engagement, interest, and the reduction of monotony. This picture shows that the pedagogical quality and motivational impact of the education board's directions were less effective when structural initiatives, such as attendance tracing and the use of online platforms, were in place.

These results echo the studies of (Zhao & Watterston, 2021; Adnan, 2020; Doghonadze et al., 2020; Elfrianto et al., 2020; and Kaur & Bhatt et al., 2020) who found connectivity of motivational issues, availability of resources, strategies for instructions influencing satisfaction of students regarding digital learning settings.

Arefin et al. (2023) noted that, despite the availability of digital platforms, meaningful participation was hindered by limited digital literacy among both teachers and students.

7.3 Role of Digital Platforms

Progress in digital adoption is evident in the high awareness of and use of Google Meet. The moderate mean score on student engagement indicates that using only an online platform did not ensure quality education. However, this underscores the need to distinguish between access and effective use.

7.4 Broader Implications

The findings highlighted a gap between the education board's policy directions and students' experiences. Although the students were aware of the compilation of digital attendance-related requirements, they remained less motivated and less engaged, highlighting the importance of adopting solutions and human-centered mechanisms that address pedagogy, motivation, and feedback. The efforts must focus on:

1. Improve the capacity of teachers regarding interactive online pedagogy.
2. Strong communication procedures for monitoring and reporting should be ensured.
3. Support the affective needs of students along with technical directions.
4. Rural-urban inequalities in digital readiness should be addressed.

Addressing such gaps, education authorities can build more robust and fairer systems that not only withstand crises but also improve long-term student participation and learning.

7.5 Demographic Variations

The demographic subgroups analysis enhances the tone of these study findings. The findings reflect that overall attitude regarding sex differences was not statistically significant ($t = 0.782$, $p = .435$), males stated significantly higher scores for reducing monotony ($t = 2.105$, $p = .036$) and active engagement ($t = 2.465$, $p = .014$), whereas females described greater interest in directions ($t = -2.588$, $p = .010$). This suggests that sex affects specific attitudinal dimensions rather than overall attitude. Likewise, variation in teacher involvement and monitoring practices is found in government and private colleges. These findings underscore the importance of adapting educational management mechanisms to the context of area, equity, and institution type.

8. Key Findings

The analysis reveals valuable insights into the knowledge and attitudes of higher secondary students regarding the education board directives in post-COVID Bangladesh. First, the students were relatively aware of official board instructions, such as attendance requirements, monitoring of online classes, and use of digital platforms. This implies that the institutional communication systems were mostly successful in spreading formal instructions. Second, although this was a comparatively good knowledge base, the students indicated moderate levels of interest and engagement in online learning activities. There was a conspicuous disconnect between knowledge of the instructions and goodwill toward their execution. Many respondents found online courses to be habitual, less engaging, or even less motivating than face-to-face education. Third, although the institutional checks on attendance and compliance seemed apparent to students, the transparency of reporting processes and accountability systems was relatively low. This implies the enforcement structures were not necessarily transparent and were not understood at the learner level. Fourth, statistically significant differences were found across demographic categories. Attitudinal differences and, in some instances, knowledge differences were related to district and area of residence (rural-urban differences) and type of college (government versus private). These differences underscore the maintenance of contextual disparities in digital access, institutional readiness and learning conditions. Fifth,

structural constraints included infrastructural and socio-psychological can-or-can't factors, such as internet unpredictability, device constraints, screen burnout, and diminished interaction with peers, as barriers to sustained involvement and engagement in online learning. In general, the results indicate that policy-level directives were widely communicated and familiarized with, but their translation into meaningful, engaging, and equitable learning experiences was not evenly distributed across contexts. The results underscore the importance of moving beyond compliance-based implementation toward quality-enhancing and equity-sensitive digital education strategies.

9. Conclusion

This study examined the knowledge and attitudes of higher secondary students in Bangladesh regarding the education board's directions during and after the COVID-19 period. Results show that the students were more aware of the education board's directions on online classes and attendance requirements, though they were less familiar with monitoring and reporting mechanisms. It was also noted that the students' attitudes indicate appreciation for teachers' monitoring and the institution's initiatives, while reflecting weaker engagement and interest and reduced monotony.

Additionally, these findings revealed that experiences were not uniform across students' demographic features. Although sex differences were not significant, disparities were observed by district, area of residence, and type of college. However, students from urban areas showed more positive attitudes, while students at government colleges perceived clearer institutional monitoring than those at private colleges. These variations underscore the importance of accounting for contextual differences in policy implementation.

Finally, the findings indicate that although the policy interventions affected students' access and compliance, they did not meaningfully impact engagement and motivation. However, the effects were uneven across demographic subgroups.

10. Policy Recommendations

To strengthen education management in similar crises, this study recommends:

- **Enhance online teaching among educators:** To improve the level and quality of online and hybrid learning, teacher-training programs should focus on digital pedagogy instead of technical literacy exclusively. Teachers ought to be trained to develop interactive lessons, use multimedia tools, and administer online tests, which will go a long way toward involving students in the learning process. Professional growth and peer-learning platforms may further help teachers adapt to evolving technologies and improve instructional quality during crises.

- **Standardized monitoring and accountability systems**: An acceptable system of supervision, assessment, and reporting should be adopted to bring about transparency and collective responsibility between teachers, students, and administrators. Well-defined accountability procedures, performance indicators, and feedback systems would help pinpoint implementation gaps and promote evidence-based strategies in remote and blended learning.

- **Bridge the digital divide by equal infrastructure:** There is a high cost involved in widening ICT infrastructures, increasing internet connectivity, and facilitating access for all learners, not just the affluent, but even in remote and disadvantaged social

groups. Technological inequalities can be mitigated through public-private collaborations and government subsidies. Inclusion will also be reinforced by the formation of community digital hubs and learning materials accessible offline.

- **Combine psychosocial and motivational assistance:** Remote learning often tends to cause stress, isolation, and disengagement among the students. Thus, online education structures need to accommodate psychosocial and inspirational techniques. The integration of counseling, peer support, and teacher-student mentoring will help maintain the learner's well-being and motivation, reduce the risk of dropping out, and increase emotional resilience.

- **Institutionalize blended-learning frameworks**: To ensure adaptability during disruptions, blended-learning models that combine digital and face-to-face instruction should become a permanent feature of education systems. When properly structured, these models improve flexibility, encourage collaboration, and maintain continuity even during emergencies. They also foster the digital competence necessary for future learning ecosystems.

- **Target equity and inclusion gaps**: Policy efforts must prioritize students who face compounded disadvantages, such as those from rural, low-income, or under-resourced private institutions. Tailored interventions, financial assistance, and sex-sensitive initiatives can promote equitable participation and prevent long-term educational exclusion. Closing these gaps will build a more inclusive and resilient education system for all learners.

11. Future Research

Further studies should explore how these knowledge–attitude dynamics vary by demographic factors such as sex, urban/rural location, and socioeconomic status. Longitudinal research could also examine whether shifts in student attitudes persist beyond the pandemic. Comparative studies across countries may deepen understanding of how different education systems navigate similar challenges.

12. Limitations

This study has several limitations that should be acknowledged. First, the cross-sectional design captures student knowledge and attitudes at a single point in time, limiting the ability to infer causal relationships or changes over time. Second, data were collected via self-report questionnaires, which may be subject to recall or social desirability bias. Third, while the sample of 390 students covered multiple institutions, it may not fully represent all higher secondary students in Bangladesh, particularly those from the most remote or marginalized communities. Fourth, the study relied primarily on descriptive statistics; additional inferential analyses could provide deeper insights into subgroup differences.

Although subgroup analyses were conducted across sex, district, area of residence, and type of college, the equal distribution of respondents across some categories (e.g., districts and residence areas) was designed rather than naturally occurring. This sampling strategy enhances comparability but may not perfectly reflect the real-world demographic proportions of higher secondary students in Bangladesh. As such, caution should be exercised in generalizing subgroup findings beyond the study population.

Despite these limitations, the findings offer valuable insights into how higher secondary students perceived and responded to education board directives in the post-COVID context. Future research using mixed methods, larger, more diverse samples, and longitudinal designs could build on this work to provide a more comprehensive understanding of students' experiences.

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