Research Article

Students' Satisfaction in Online Class during COVID-19: An Empirical Study in Bangladesh Context

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The COVID-19 pandemic caused higher education institutions to switch to online learning. This unique endeavor is being investigated to protect high-quality education. Due to its hasty and emergency implementation, students may have different opinions about this new education system. The primary objective of this study is to investigate the relationships between constructs such as students' perceived effectiveness, institutional facility, teaching material, and overall satisfaction during the COVID-19 outbreak. Adopting a quantitative research approach, this study was conducted between November 8, 2020, and February 12, 2021, in private universities in Bangladesh. Data were utilized in structural equation modeling (SEM). The findings revealed that perceived effectiveness (0.68, p-value = 0.01), institutional facility (0.23, p-value = 0.01), and teaching material (0.14, p-value = 0.01) are all positively and significantly associated with satisfaction with an online class module. In addition, trajectory analysis establishes a link between satisfaction and effectiveness in e-learning through the SEM. The results of the study also indicate a strong and positive correlation between satisfaction with an online class module and perceived effectiveness, institutional setting, and teaching material. This study will serve as a catalyst for understanding students' satisfaction in an online environment, as well as a benchmark for various stakeholders, particularly policymakers, practitioners, academicians, and institution owners, to take the necessary steps to ensure a sustainable online learning platform.

1. Introduction

In February 2020, the People's Republic of China reported a total of 75,465 cases of COVID-19. Soon after, the World Health Organization declared the coronavirus outbreak a pandemic [1]. The COVID-19 pandemic has emerged as an unprecedented global crisis, exerting a substantial influence on diverse facets of human existence, notably the realm of education [2]. Governments worldwide have implemented a range of policies aimed at mitigating the transmission of the coronavirus. In response, individuals have diligently complied with measures, such as practicing social distancing and self-isolation. Citizens are compelled to live, work, worship, and study at home due

to these unfavorable conditions [3]. In order to mitigate the spread of the highly contagious coronavirus, Bangladesh's government, like that of many other countries, has chosen to close educational institutions such as schools, madrasahs, colleges, and universities in Bangladesh, which have been temporarily closed since March 17, 2020 [4, 5]. During the COVID-19 outbreak, nearly 1.5 billion students (91%) were affected [6]. Higher education and research were among the areas affected, with one of the most severe disruptions occurring during the lockdown times. The global education system is changing, and educational institutions around the world are closing their doors to implement social distancing techniques among students [7–9]. Higher educational institutions have

switched from face-to-face learning to emergency remote teaching [10] to reduce coronavirus transmission [11, 12], and educational institutions have begun to provide students with online classes and learning opportunities [13]. In Bangladesh, 37 million students suffer from the closure of educational institutions [14]. The government of Bangladesh has also recommended the adoption of virtual education as a means to ensure students remain actively involved in their studies during this extended period of shutdown. Consequently, the education sector has been fighting to survive the crisis by adopting different e-learning platforms since teachers and students were forced to stay at home to avoid being infected by this most contagious virus [15].

The online learning experience during the pandemic has been a novel and transformative journey for students in the Bangladesh context. The predominant mode of education in this nation is primarily centered around traditional, in-person classroom settings. The majority of students lacked prior familiarity with the procedures involved in technology-based online education systems. In addition, the primary obstacles to the digitalization of higher education are socio-economic and technological constraints [16–18]. However, in the initial stages, the educational system exhibited unstructured and disorganized characteristics, as both students and teachers were inexperienced in navigating this new dimension. Amidst these challenges, the satisfaction of students with online classes has become a significant topic of concern for educators and legislators. Understanding student satisfaction is essential because it influences engagement, motivation, and overall learning results. Furthermore, it provides significant insights into the effectiveness of online education during a crisis and informs future initiatives to improve remote learning quality. Due to the shift towards online schooling during the COVID-19 epidemic, most of the prior studies have focused on notable learning outcomes. There has been very little research on learner satisfaction in terms of effectiveness, facility, and material in the field of tertiary education in Bangladesh. Therefore, the current study aimed to assess whether COVID-19 university students were satisfied with online classes. We intend to highlight the factors that influence the satisfaction of university students with online learning. This study, on the other hand, is well-justified due to its originality, real-world relevance, methodological rigor, policy implications, and potential for contributing to educational progress and societal impact in the specific context of Bangladesh and beyond.

Furthermore, this study is of utmost importance as it provides significant insights into the efficacy of online education, sheds light on the difficulties encountered by students during the pandemic, and establishes the foundation for enhancing virtual learning platforms in both the local context of Bangladesh and on a global level. With the inclusion of academic perspectives in the decision-making process, the study provides valuable insights for practitioners, including educational institutions and policymakers, regarding the effectiveness of online classes and the satisfaction levels of students. These findings can help with resource allocation, policymaking, and the design and implementation of online education. Following that, pedagogical adaptability and understanding of student satisfaction with online courses assist practitioners in identifying areas for growth. Practitioners have the potential to enhance online learning by effectively adapting teaching methods, course materials, and instructional procedures to align with the diverse expectations of online learners [19].

2. Literature Review

Online learning, an instructional approach conducted through virtual platforms and internet-enabled devices, has gained prominence, especially with the COVID-19 pandemic compelling educational institutions worldwide to adopt it as a primary mode of instruction. This shift has sparked a need for research into students' satisfaction with this new learning paradigm. While some studies [20–23] have reported favorable outcomes of online classes, others have highlighted limitations.

The concept of effectiveness within the realm of online learning refers to how students perceive the efficacy of instructional methods in achieving educational goals. A plethora of studies [24–26] have consistently delved into the effectiveness of online classes, exploring student sentiments, pros, cons, and other dimensions. For instance, the competence of educators significantly influences the success of online courses, with the instructor's online presence, engagement, connection, and pedagogical skills being pivotal drivers for effective facilitation [27]. A further investigation revealed that a notable percentage of students displayed a positive inclination toward online courses, as evidenced by 80% of respondents stating an intention to persist with digital learning in the period following the pandemic. It is noteworthy to remark that the usage of regression analysis indicated that the level of student engagement with both peers and instructors served as a predictive factor in assessing the efficacy of online courses [28]. In contrast, a small number of recent studies [29, 30] have found that online learning has potential for higher education in Bangladesh, albeit with some limitations. These studies also look at the important role that educators must play in enhancing online learning, with the participation of other key stakeholders, including the institution, government, University Grants Commission (UGC), and the Ministry of Education.

The diversity of teaching resources also plays a crucial role in the success of e-learning. A recent study [31] highlighted student preferences for online lectures, course materials, and primary sources over podcasts and knowledge review quizzes. Course design and content intricacies are also instrumental in optimizing e-learning effectiveness. For instance, a study titled "Effectiveness of Online Learning in Pandemic COVID-19" highlighted the mixed results of online learning during the global health crisis, where effectiveness and efficiency were both positively and negatively impacted [32]. The efficacy of online learning is influenced by a number of integrated components, including students, educators, learning materials, and technology. The facility aspect, encompassing technological infrastructure and support, is another vital variable impacting student satisfaction. Previous studies [33–35] underscored the role of facility-related challenges

in e-learning during the pandemic, analyzed based on diverse educational environments and institutional provisions. To optimize e-learning effectively, students and educators must have access to appropriate facilities and a comprehensive understanding of e-learning platforms [36]. In addition to that, teaching materials such as course notes, videos, and primary literature constitute a crucial element of online courses. Effective learning materials, such as topic-specific videos, lesson plans, and practical exercises, enhance learning quality and student satisfaction [37]. Furthermore, the capacity to access course materials at any time and from any location has emerged as a significant advantage of online education, contributing to perceived flexibility and convenience [13, 38].

As a result, it is quite evident that online learning offers numerous advantages, such as enhanced flexibility, exposure to diverse educational environments, varied course options, and engagement within student communities [39–42]. Observational research [43] highlighted the role of e-learning technology in advancing constructivist pedagogies, while another study found a positive correlation between online course participation and quantitative reasoning skills [44]. Students often perceive online courses as more flexible and convenient compared to traditional classes, with better control over study pace and schedule [45, 46].

However, transitioning from in-person to online classes can pose challenges, particularly for those unfamiliar with the format. Concerns about reduced educational quality in the online context have been reported [47]. Some students experience unease and mental strain with online learning [48–50], and limitations in teacher–student interaction persist in certain settings [16, 50]. Technological barriers, including limited infrastructure, connectivity issues, and high costs, also affect online education [49–52]. System-level and school-level factors contribute to learner dissatisfaction, ranging from traditional education structures to technological shortcomings [53]. Particularly in low-income countries, limited internet access and mobile network difficulties hinder online learning adoption [54].

The shift to online learning during the pandemic has led to a focus on learning outcomes, yet there is a scarcity of research on learner satisfaction in tertiary education in Bangladesh. This study seeks to evaluate the satisfaction of COVID-19 university students with online classes, shedding light on influencing factors. The study explores the relationship of effectiveness, facility, and teaching materials, which are key variables affecting student satisfaction with online learning. Effective teaching methods significantly shape students' perceptions of online learning success. Adequate facilities ensure seamless access to resources, while high-quality teaching materials enhance engagement and overall satisfaction. The unprecedented shift from face-to-face to online teaching and learning has raised concerns about students' satisfaction with the effectiveness of online education, the facilities provided, and the quality of learning materials. Understanding students' perspectives on these key aspects is vital for improving the online learning experience and ensuring better learning outcomes during such challenging times. Considering the research objectives, this study seeks to determine the effectiveness of the tools and measures employed to enhance the quality of teaching and learning amidst the COVID-19 crisis. As a result, the following three hypotheses will be investigated in this study:

H1: Perceived effectiveness does not impact the level of satisfaction of tertiary-level students.

H2: Facility does not impact the level of satisfaction of tertiary-level students.

H3: Teaching materials do not influence the level of satisfaction of tertiary-level students.

3. Materials and Methods

3.1. Study Design and Settings. A cross-sectional, questionnaire-based research design was used in this study to investigate the relationship between interaction and online learning satisfaction among tertiary students. An online survey was used to collect responses from 402 participants between November 8, 2020, and February 12, 2021. After removing missing and incorrect responses, we had a total of 389 respondents. Bangladeshi private university students who attended online courses during COVID-19 were the respondents of this study. A convenient sampling technique was used to gather the primary data [55, 56].

3.2. Questionnaire and Measures. During the COVID-19 outbreak, numerous academics conducted different studies [57–59] on online education to examine its effectiveness, accessibility, course materials, acceptability, and educational quality. Few studies [58–60] have focused on learner satisfaction with online instruction, especially in the transition from traditional to online learning environments. The results show that students react differently to online education based on their abilities to use online tools, access online courses, and undertake learning activities. According to Prihandoko [61], the availability of online learning resources and prior understanding of online information literacy may also be key factors. Lastly, Allen and Seaman's [62] proposal for open educational resources may be essential for remote learning and online education during a pandemic. Following a review of the literature, this study identified three parameters (effectiveness, facility, and material). Based on the findings, a questionnaire with the three following factors was designed.

3.2.1. Effectiveness.

(i) The online mode of education enhances your academic learning in the current situation. (E1)

(ii) The use of synchronous/asynchronous e-learning is effective. (E2)

(iii) Your overall academic motivation before the transition to online classes was high. (E3)

(iv) Your overall academic motivation currently is high. (E4)

(v) Graded assignments are a major contributor to your motivation. (E5)

3.2.2. Facility.

(i) My institution shares recorded lectures with students who are unable to attend classes. (F1)

(ii) There are meeting hours other than classes for discussion. (F2)

(iii) There is distortion in connection with a teacher. (F3)

(iv) The voice of a teacher is clear during online classes. (F4)

(v) The attendance of students and teachers is being marked. (F5)

(vi) Feedback is given after every class. (F6)

3.2.3. Material.

(i) The provided learning material is appropriate and relevant. (M1)

(ii) Teachers allow all students to participate fully. (M2)

(iii) Teachers are available at a given time for an online class and are helpful. (M3)

(iv) Teachers are effectively and properly delivering lectures and demonstrations. (M4)

(v) The teaching strategy of teachers stimulates students' interest. (M5)

(vi) Teachers are properly managing class discipline during online lectures. (M6)

(vii) The meeting hours help students understand concepts. (M7)

These questions are aimed at the dependent variable of student satisfaction, which was utilized to ask the following questions to the students:

(i) Are you satisfied with the method of teaching? (S1)

(ii) Are you satisfied with the content you are getting online from teachers? (S2)

(iii) Are you satisfied with the understanding level of the teacher's lecture? (S3)

The responses were distributed according to the Likert scale (1 = strongly disagree to 5 = strongly agree) to calculate the mean, standard deviation, Cronbach's alpha, Kaiser–Meyer–Olkin (KMO) statistic, and rotated factor loading for further analysis. The structural model is used, which outlines effectiveness and facility, and materially assists significantly with the satisfaction level of students through path coefficients with directions. The model fit indexes of Chi-square, RMSEA (root mean square error of approximation), PCLOSE, CFI (comparative fit index), and TLI (Tucker–Lewis index) are administered.

3.3. Sample and Data Collection.
The study's target population was Bangladeshi private university students. These universities are indicative of all others in the QS World Ranking 2020. During the COVID-19 crisis, an online questionnaire survey was conducted to obtain data from students of private universities who started using an online learning system. We invited students to participate in the poll by posting it on Facebook, Instagram, and WhatsApp. We obtained 389 valid responses to the survey.

3.4. Data Analysis.
The study considers a multivariate analysis of three factors—effectiveness, material, and facility—where the factor loadings on Varimax rotation are applied to exhibit rotated factor loadings for explaining the square combination of a specific factor. Confirmatory factor analysis (CFA), according to the measurement model, confirms three factors that explain the greatest variation in overall study variables. Furthermore, Cronbach's alpha [63] and KMO [64] indicate that sample size, model adequacy, and overall interim correlation were well-fitted. By linking satisfaction, the structural equation modeling (SEM) is evaluated. In this study, we employed three different statistical techniques such as SEM, factor analysis, and principal component analysis (PCA). PCA is suitable for this study because it can simplify complex data sets and identify the most important factors influencing student satisfaction in online classes during COVID-19 [65, 66]. To simplify complex data sets and identify the most important factors influencing student satisfaction in online classes during COVID-19, we applied factor analysis [66]. SEM is an appropriate method for our investigation because of its ability to examine the associations between latent variables and observable variables [67, 68]. Effectiveness, facility, and material are all positively associated with satisfaction levels. To display students' satisfaction level with e-learning during the COVID-19 epidemic, we base our analytical report on three major factors: effectiveness, facility, and material. Table 1 shows the results. The SEM is used for the structural model. Factor analysis is divided into three categories that reduce 21 variables to four. For factor analysis, we attempt to use the principal component factor [69, 70] technique.

4. Results

This study is designed to demonstrate how much satisfaction is attained in an e-learning class format that used a comprehensive, precise, and informative questionnaire during the COVID-19 havoc period. This analysis involves an estimated 389 respondents. In descriptive statistics (Table 2), we show sex, age group, education level, mode of e-learning, preference for e-learning, and class duration during COVID-19. Out of 389 respondents, 53.73% were male, and 46.27% were female. Overall, 34.19% of respondents are still under the age group of 20 years. More than half of the respondents (53.73%) range from 21 to 23 years of age. In terms of educational level, 80% (80.98%) are undergraduates. However, in preference, both methods of e-learning are used (approximately 48.59%).

4.1. Measurement Model.
SEM is a statistical analysis technique employed to examine structural relationships. This technique is a combination of factor analysis and multiple regression analysis, serving to examine the underlying structural associations between observed variables and latent

TABLE 1: Basic statistics and multivariate output of factors.

Variables	Mean	SD	Cronbach's alpha	KMO statistic	Rotated factor loadings
Effectiveness (AVE = 0.821, CR = 0.958)			0.853	0.911	—
E1	3.620	1.337	0.828	0.884	0.927
E2	3.650	1.293	0.801	0.884	0.930
E3	3.380	1.249	0.839	0.927	0.895
E4	3.430	1.153	0.812	0.933	0.888
E5	3.370	1.217	0.829	0.933	0.892
Facility (AVE = 0.979, CR = 0.963)			0.955	0.936	—
F1	3.580	1.277	0.947	0.947	0.897
F2	3.510	1.397	0.945	0.926	0.911
F3	3.480	1.393	0.945	0.940	0.908
F4	3.480	1.419	0.946	0.934	0.905
F5	3.450	1.393	0.947	0.941	0.898
F6	3.460	1.384	0.946	0.927	0.902
Material (AVE = 0.755, CR = 0.959)			0.936	0.901	—
M1	4.190	1.087	0.931	0.964	0.807
M2	4.290	1.160	0.929	0.838	0.833
M3	4.470	0.872	0.925	0.947	0.886
M4	4.380	1.040	0.928	0.853	0.831
M5	4.440	1.005	0.917	0.875	0.951
M6	4.540	0.937	0.918	0.905	0.938
M7	3.830	1.377	0.936	0.954	0.825
Satisfaction (AVE = 0.854, CR = 0.946)			0.915	0.782	—
S1	3.760	1.321	0.872	0.748	0.928
S2	3.790	1.282	0.886	0.779	0.918
S3	3.770	1.288	0.873	0.752	0.927

TABLE 2: Frequency distribution of the study variables.

Variable	Frequency	Percentage (%)
Sex		
Male	209	53.73
Female	180	46.27
Age group		
Less than or equal to 20 years	133	34.19
21–23 years	209	53.73
24–25 years	47	12.09
Education level		
Undergraduate	315	80.98
Graduate	46	11.83
Postgraduate	18	4.63
Others	10	2.57
Mode of using e-learning		
Asynchronous	33	8.48
Synchronous	182	46.79
Both	174	44.73
Preference of using e-learning		
Asynchronous	111	28.53
Synchronous	89	22.88
Both	189	48.59
Class duration		
Less than 30 min	12	3.08
30–60 min	78	20.05
More than 1 hr	299	76.86
Total	389	100

constructs. SEM consists of two main components: the measurement model and the structural model. The measurement model is responsible for assessing the latent variables or composite variables, whereas the structural model evaluates all the hypothetical dependencies using path analysis [71]. This model, on the other hand, starts with two steps: approving the measurement model via CFA and fitting the structural model to the latent variable via path analysis. CFA is a special form of factor analysis used to test whether measures of a construct are consistent with a researcher's understanding of the nature of that construct (or factor) [71, 72]. CFA is used to test whether the data fit a hypothesized measurement model, which is based on theory and/or previous analytic research. CFA is used to verify the factor structure of a set of observed variables and to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists [72]. Once the measurement model is approved, the structural model is fitted to the latent variables to estimate the relationships between them. On the measurement model, we perform CFA in a single order. SEM is especially useful when investigating causal relationships, allowing researchers to specify directional connections among latent constructs. It involves assessing model fit using indices like *chi*-squared, CFI, RMSEA, and SRMR. All statistical methods in this report were examined using STATA 14.0. Cronbach's alpha is cut off at 0.7 to indicate an acceptable level of initial consistency. In addition, average variance extracted (AVE) and composite reliability (CR) are studied. The overall mean for "effectiveness" is "neutral." Cronbach's alpha performed better for factor analysis (average = 0.853), and the KMO measure comes in at 0.911 for better sampling size and model adequacy. Table 1 also shows rotated factor loadings after a Varimax rotation. Factor loadings have high ratings, indicating a better relationship between variables under the factor "effectiveness." The average ranges from 3.45 to 3.58 under "Facility." Cronbach's alpha is 0.955 on average, and KMO is 0.936. The Likert scale is numbered from 1 to 5, with 1 being never and 5 being always. On the "sometimes" scale, the average is nudged. The mean ranges from 3.83 to 4.47 under "Material." Factor loadings performed well after Varimax rotation as well. Cronbach's alpha (0.936) and the KMO statistic (0.901) are both satisfactory.

Under the dependent variable of satisfaction, the respondents' average lies from 3.76 to 3.79, and Cronbach's alpha comes to 0.915. Factor loadings exhibit high ratings that assess the better relationship among variables under the factor "effectiveness." The average is nudged on the "sometimes" scale under the factor "facilities." The average response for the factor "material" comes to "very often," where factor loadings after Varimax rotation perform well. Rotated factor loadings exhibit better scores for the dependent factor "satisfaction."

According to Table 1, the CR for all constructs is greater than 0.70, and the AVE values range from 0.755 to 0.979. Overall, discriminant validity for this measurement model can be accepted, which supports discriminant validity between the constructs. This is demonstrated by the fact that diagonal elements are larger than off-diagonals in Table 3.

TABLE 3: Fornell and Larcker test for discriminant validity.

	Satisfaction	Effectiveness	Facility	Material
Effectiveness	0.9065*	—	—	—
Facility	0.8150	0.9896*	—	—
Material	−0.2367	−0.2424	0.8689*	—
Satisfaction	0.7865	0.7274	−0.0796	0.9242*

*Indicates square root of AVE.

4.2. Structural Model. In the structural model, we investigate hypothesis-based testing to determine whether our underlying factors stimulate the satisfaction level of students with e-learning. For this reason, we attempt path analysis using the maximum likelihood technique. Coefficients from one variable to another are shown in parentheses in Figure 1, where the first value is a standardized coefficient and the second is the *p*-value.

Effectiveness, facility, and material assistance all play a statistically significant role in determining student satisfaction. This study found a positive and significant relationship between e-learning system satisfaction and effectiveness ($\beta_1 = 0.68$, SE = 0.071, z-statistic = 9.51, p-value < 0.01), facility ($\beta_2 = 0.23$, SE = 0.074, z-statistic = 3.9, p-value < 0.01), and material ($\beta_3 = 0.14$, SE = 0.033, z-statistic = 4.18, p-value < 0.01) on satisfaction of e-learning systems. Therefore, three hypotheses, H1, H2, and H3, were rejected. Educational satisfaction among tertiary-level students is significantly impacted by three latent factors: effectiveness, facility from staff and campus organizations, and material availability on IT-based products. Results are given in Table 4. So, effectiveness effects are stronger than the availability of facilities and the adequacy of materials. For the fitness of our assumed model, some statistics and their references are provided in Table 5.

In Table 5, the next item is the fitness of the model under several fitness indices. The *chi*-square to df (3) ratio is 496.771, with a *p*-value of 0.11. The RMSEA for this model was 0.06. Additionally, the computed PCLOSE (0.00) was significantly higher than .050. There are two popular indices: the CFI and the TLI, which were at 0.96 and 0.95 for both, respectively. Hence, we conclude that the model had an excellent fit under all of this evidence. In the study data, there is no outlier, and each variable's basic statistic is under normality with a symmetric shape on skewness and kurtosis. Our conceptual framework is significant in Table 4 under three hypotheses. To begin, as evidenced by a larger beta coefficient, overall effectiveness or perceived effectiveness had a significantly positive impact on student satisfaction. Second, though the beta coefficient is slightly small, the available facility was statistically significant under a 1% level of significance (0.229). Finally, the available teaching materials revealed critical information about student satisfaction. As a result, this study provided significant evidence to support three hypotheses.

5. Discussion

This study has presented noteworthy findings through the application of an SEM. The initial hypothesis sought to
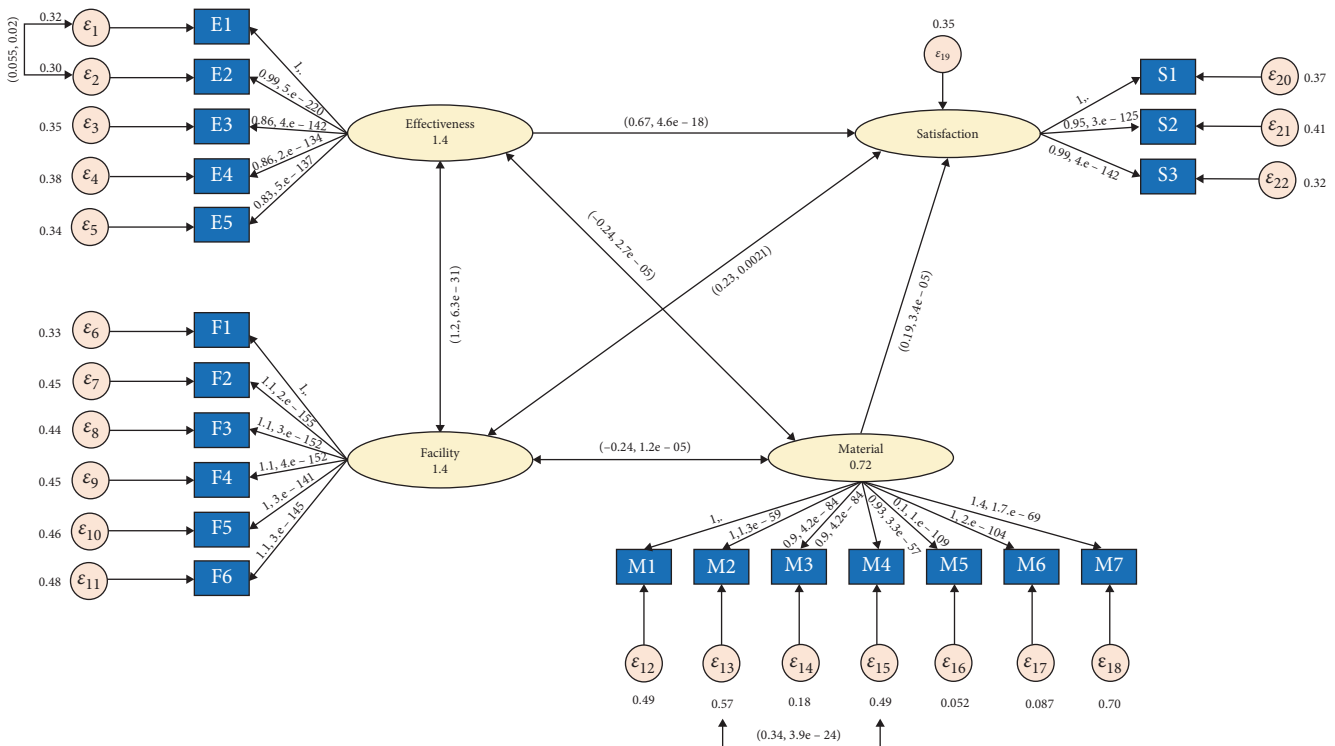
FIGURE 1: Path diagram among study variables.

TABLE 4: Path coefficients with direction.

Path diagram	Coefficient	SE	Z-Statistic
Effectiveness > satisfaction***	0.680	0.071	9.51
Facility > satisfaction***	0.229	0.074	3.10
Material > satisfaction***	0.138	0.033	4.18

***Indicates significant under 1% level of significance.

TABLE 5: Model fit of path diagram under SEM.

Fit index	Calculate statistic	Recommended level
Chi-square	496.771	Nonsignificant
RMSEA	0.06	<0.07
PCLOSE	0.00	<0.50
CFI	0.96	>0.95
TLI	0.95	>0.95

establish a connection between effectiveness and satisfaction, revealing a statistically significant relationship. This confirms what Kintu et al. [73] concluded in their study. This observation informed the adoption of graded assignments and online modules, underscoring the pivotal role of online motivation in stimulating student engagement and augmenting their efficacy—both of which were found to be statistically significant and correspond with [74, 75]. Graded assignments and online modules can help improve students' performance and engagement in the learning process. Moreover, the utilization of synchronous or asynchronous e-learning modalities facilitated enhanced comprehension and familiarity with contemporary

tools [76]. Synchronous learning involves real-time interaction between instructors and students, while asynchronous learning allows students to access course materials and complete tasks at their own pace. Blending these modalities can provide a more effective and engaging learning experience, ultimately leading to higher satisfaction levels among students.

The second hypothesis aimed to ascertain the extent to which the availability and limitations of facilities impacted satisfaction levels. The findings positively affirmed this association, albeit to a modest degree, which is consistent with the studies undertaken by Hasan et al. [77] and Cho and Tobias [78]. Consequently, the outcomes accentuated the merits of a well-structured class system, robust supervision, and meticulous feedback monitoring in ameliorating challenges and fostering self-reliance among students.

The final hypothesis aimed to substantiate the influence of available teaching materials on student satisfaction, yielding statistically significant results at the 1% significance level. This underscores the role of accessible resources—comprising teaching hours, lectures, demonstrations, instructional strategies, and interactive platforms—in expediting the comprehension and assimilation of subject matter. The hypothesis highlights the importance of accessible teaching materials in enhancing student satisfaction in the learning process. Accessible resources, such as teaching hours, lectures, demonstrations, instructional strategies, and interactive platforms, can facilitate better comprehension and assimilation of subject matter [79].

The quality framework consists of student satisfaction, teacher satisfaction, learning effectiveness, accessibility, and the cost-effectiveness of the institution [80, 81]. According to

the findings of this study, satisfaction is correlated with three major factors: efficacy, facility, and material. Since online learning can isolate students from traditional campus settings and peers, academic motivation is emphasized as an even more significant predictor of learning outcomes and satisfaction. Notably, the exigencies of the COVID-19 pandemic accentuated the prominence of motivation analysis, given the sudden shift to extensive online learning. In this context, students' unpreparedness for this mode of instruction underscores the significance of their motivation in commencing and sustaining their educational pursuits, with self-motivation emerging as a potent enhancer of student satisfaction [82–85].

A supplementary factor contributing to student satisfaction lies in modern blended online learning opportunities that facilitate interactions with peers, mentors, and reviewers. This latent construct encompasses e-services, information provision, and e-learning quality, all of which synergistically contribute to students' contentment with their online learning experiences [86]. Furthermore, the incorporation of modern pedagogical support, online class strategies, and technical assistance augments satisfaction in the realm of online learning.

These findings resonate with prior research by various scholars [52, 87–90], affirming the interconnectedness of motivational factors, resource availability, and instructional strategies in shaping student satisfaction within the digital learning landscape. As advocated by certain scholars [90, 91], educational institutions must continually revise and innovate their curricular frameworks to effectively cater to the demands of online education. This study offers a snapshot of the COVID-19 era, capturing a genuine portrayal of student experiences during this exigent period. Despite the insights gleaned, it is acknowledged that challenges such as e-learning limitations, economic constraints faced by students, instructor proficiency, and resource scarcity are foreseeable limitations. However, this study endeavors to encapsulate students' perspectives by encompassing diverse elements, including content engagement, adaptation to contemporary educational facilities, asynchronous and synchronous learning modalities, and the promotion of problem-solving skills. Consequently, these findings provide a foundation for future research endeavors, which could employ advanced methodologies such as high-order CFA and sophisticated structural equation modeling techniques to delve deeper into the intricate dynamics underpinning online learning satisfaction.

6. Study Limitations and Future Scopes

While valuable, this study has limitations that point to areas needing further exploration. First, its focus on developing countries, particularly those early in adopting online learning, may limit generalizability to well-established systems. Future research should broaden the scope for a more comprehensive view. Second, this study omitted considerations of student motivation, online teaching quality, and potential moderating factors, which may have led to a somewhat simplified model. However, the decision to limit the questionnaire

size due to its online administration aimed to mitigate potential boredom-induced inaccuracies in student responses. Third, participants were solely from private universities in Bangladesh, potentially limiting their broader applicability. Including students from diverse institutions and regions could provide a more comprehensive perspective. Lastly, the study's online survey methodology offers insights, but supplementing quantitative data with qualitative approaches like interviews could provide a richer understanding of online education's complexities.

7. Conclusion and Policy Recommendations

The COVID-19 pandemic served as the impetus for this study, which focused on the shift to online learning in order to preserve educational quality in the face of unprecedented difficulties. The investigation aimed to understand the diverse student perspectives emerging from the rapid shift to remote education. By examining the relationships among key constructs—students' perceived effectiveness, institutional facility, teaching material, and overall satisfaction—the study provided valuable insights. The results underscored significant and positive associations between perceived effectiveness, institutional facility, teaching material, and overall satisfaction with the online class module. This points to the importance of these factors in shaping students' contentment within the new educational framework. Furthermore, the study's trajectory analysis revealed a noteworthy linkage between satisfaction and effectiveness in e-learning through the SEM. This not only solidified the connection between these aspects but also emphasized their interplay in influencing students' perceptions and attitudes toward online learning. The study's findings provide practical recommendations for addressing the identified challenges in online education. Providing affordable or free internet services, as well as necessary learning instruments such as PCs and tablets, can empower students and overcome potential gaps in online learning experiences. To create an adaptable online learning environment, immediate actions such as increasing internet connections, widespread integration of learning management systems inside higher education, and organizing technical training sessions for both staff and students are required. Furthermore, educators can increase engagement and commitment by utilizing various e-learning tools. Likewise, educational institutions, in collaboration with regulatory agencies such as the UGC, should work to guarantee that online classes are equal to their traditional equivalents. This includes maintaining high standards of excellence by providing high-quality educational materials, stable connectivity, and recorded video resources. Finally, the study's findings would be highly helpful for educational institutions, practitioners, policymakers, and stakeholders in promoting successful online learning and minimizing gaps to assure long-term education policy.

Data Availability

The data will be made available upon request.

Conflicts of Interest

The author affirms that there are no conflicts of interest pertaining to the publication of this manuscript.

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