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# Does Online Education Make Students Happy? Insights from Exploratory Data Analysis

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### Abstract

This study investigates the impact of online education on student happiness. Utilizing a dataset of 5715 students sourced from Bangladesh, we employed an exploratory data analysis to analyze the quantitative data. The key finding is that there is a prevalent trend of dissatisfaction with online education among Bangladeshi students, regardless of demographic factors like age, gender, education level, preferred device for access, or type of academic institution. The dissatisfaction trend highlights the need of continuous improvements and targeted interventions are essential to ensure online education not only enables academic success, but also supports the overall wellbeing and happiness of students in the context of a developing country.



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## 1. Introduction

In recent years, online education has emerged as a popular alternative to traditional face-to-face instruction, driven by advancements in technology and changing educational needs [1, 2]. This mode of learning offers significant advantages, including flexibility in scheduling

and access to a wide range of courses [3]. Students can learn at their own pace and from any location, making education more accessible than ever before. Additionally, online platforms facilitate a personalized learning experience, where students can interact with instructors and peers in a manner tailored to their individual learning styles [4–6].

**Table 1.** Variables used in this study.

Variable Names	Data Type	Values
Age	Numerical	16 - 25
Gender	Categorical	'Male' and 'Female'
Level of study	Categorical	'Up to HSC' and 'Hons or Grater'
Preferred device for an online course	Categorical	'Mobile' and 'Computer'
Institute Type	Categorical	'Public' and 'Private'
Happy with online education?	Categorical	'Yes' and 'No'

**Table 2.** Analysis conducted in this study.

Analysis Area	Description
Sentiment Distribution	The distribution of student sentiments towards online education was depicted. This involved detailing the counts of students who reported being content or dissatisfied with the online learning experience.
Preferred Device for Learning	The identification of favored devices for engaging in online courses illuminated students' device preferences for their learning activities.
Institution Type and Satisfaction	An exploration of the impact of institution type on students' satisfaction with online education potentially unveiled insights into how different institutional contexts affect contentment levels.

However, the impact of online education on student happiness remains a subject of debate. Critics argue that the virtual nature of online learning can lead to feelings of isolation and loneliness due to reduced social interaction [7, 8]. This, in turn, might affect students' mental health and overall satisfaction with their educational experience. On the other hand, proponents highlight the convenience and flexibility of online learning, suggesting that it can lead to greater student engagement and motivation [9, 10]. Despite these arguments, there is a notable lack of comprehensive research exploring the emotional and psychological effects of online education on students.

Previous studies have largely focused on tangible metrics related to online learning, such as academic performance, learning outcomes, and educational efficacy. At the same time, studies have largely overlooked more intangible factors that directly impact students, such as their overall well-being and happiness [11–13]. This predominant emphasis on performance and educational effectiveness has created a sizable gap in understanding the holistic student experience in online education environments. Specifically, there remains an open question around whether and how online platforms influence psychological factors like student happiness, satisfaction, motivation, and mental health

This study aims to address this gap in understanding the impact of online learning on student well-being by focusing on the context of Bangladesh as a case study. Bangladesh represents an important developing country with a large young population eager for quality education [14]. Online platforms present an opportunity for Bangladesh to overcome geographical and resource barriers to providing educational access [15, 16].

Focusing specifically on the Bangladeshi allows for an in-depth examination of how online learning environments may affect happiness of students, an issue largely overlooked by previous research on online learning. Findings from this case study can provide key policy and practical insights for advancing student well-being that may be applicable to other developing countries implementing online learning systems.

## 2. Materials and Methods

### 2.1. Dataset

This study employed a dataset sourced from Online Survey Data of Bangladeshi Students 2021, provided by Jannatul Ferdows on Harvard Dataverse [17]. The dataset consists of 8783 samples encompassing responses from Bangladeshi students on various topics. To ensure the data quality, we conducted preprocessing [18], including the removal of entries with missing values, resulting in a final dataset of 5715 samples. This curated dataset provides the foundation for our subsequent analyses, facilitating an in-depth examination of the viewpoints and lived experiences of students in Bangladesh. The variables in this dataset presented in Table 1.

### 2.2. Exploratory Data Analysis

To comprehensively investigate students' satisfaction with online education, a series of visual explorations were conducted to extract insightful patterns from the dataset [19, 20]. These analyses encompass a diverse set of perspectives that explained in Table 2. This visualization provides insight into students' perceptions of online learning. They present an overview and investigate various factors that greatly influence whether students are satisfied or not with online education.

Happy with online education?

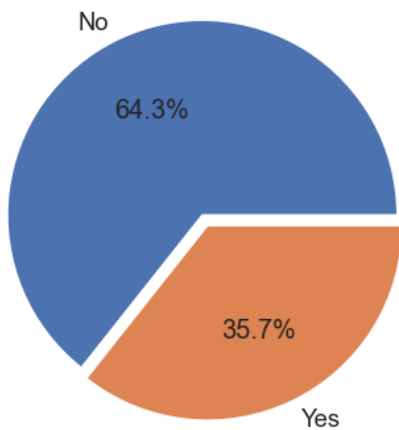


Figure 1. Sentiment distribution.

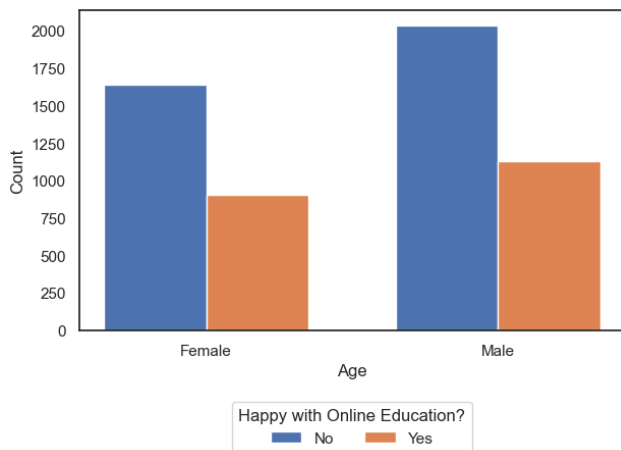


Figure 2. Sentiment distribution by gender.

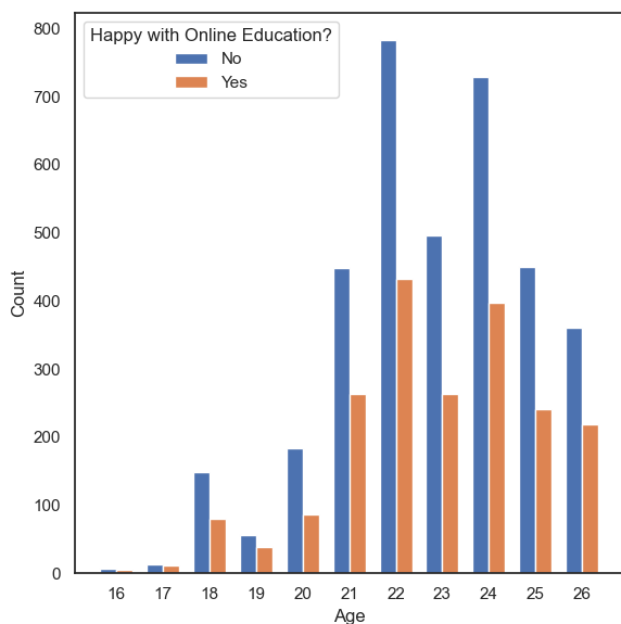


Figure 3. Sentiment distribution by age.

### 3. Results and Discussion

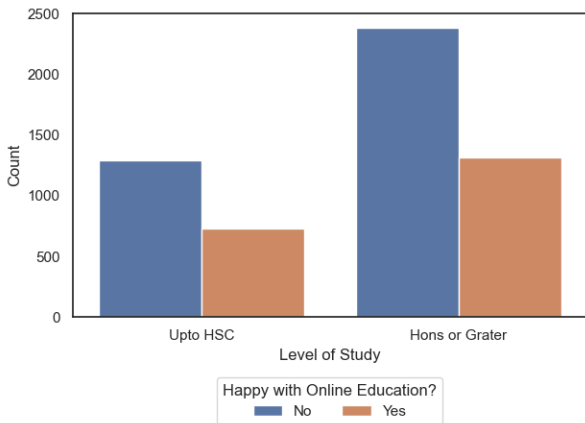
#### 3.1. Sentiment Distribution

The sentiment distribution regarding online education among students was illustrated in Figure 1. The pie chart depicted a significant inclination toward dissatisfaction, with 64.3% of the respondents having reported unhappiness with their online educational experience. In contrast, 35.7% of participants had expressed a positive sentiment, indicating that they were happy with online education.

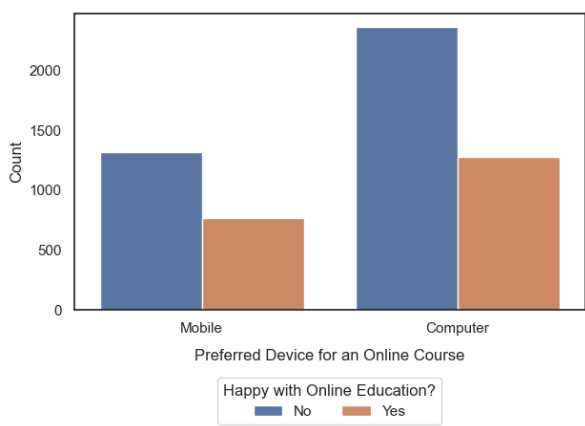
The sentiment distribution by age concerning satisfaction with online education, as depicted in Figure 2, demonstrated a unanimous trend of dissatisfaction across all age groups. The bar graph revealed that each age group, without exception, showed a clear inclination towards unhappiness with their online educational experiences. This uniform dissatisfaction was evident regardless of whether the students were younger, in the midst of their undergraduate studies, or older. The data revealed a widespread challenge in online learning settings that impacted students across all age groups, underscoring possible problems in the administration and efficacy of digital education platforms.

The analysis of sentiment towards online education, segmented by gender is presented in Figure 3. It appeared that both male and female respondents exhibited higher counts of dissatisfaction with online education. The bar chart showed that the number of respondents who were not happy with online education was greater than those who were happy in both gender categories. This observation suggested that dissatisfaction with online education was a prevalent issue across genders, although the extent to which each gender was affected may have varied.

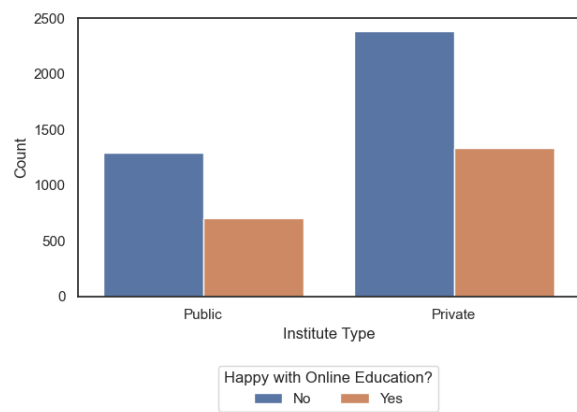
The sentiment toward online education across different levels of study: those up to Higher Secondary Certificate (HSC) and those at the Honours level or higher was shown in Figure 4. The bar chart showed that students at both educational levels were predominantly unhappy with online education, yet there was a slight edge in satisfaction among those up to the HSC level. This marginal difference might have suggested that students who were yet to enter higher education had fewer expectations and more flexibility, which could translate to a slightly higher satisfaction with online learning. They might also have been more accustomed to digital interfaces and virtual interactions, having possibly grown up with more technology integration in their lives. On the other hand, students pursuing Honours or higher levels of education had more intensive study requirements and may have experienced a greater need for in-depth



**Figure 4.** Sentiment distribution by level of study.



**Figure 5.** Sentiment distribution by preferred device.



**Figure 6.** Sentiment distribution by institute type.

interaction, discussion, and access to resources, which may not have been as effectively provided through online platforms. Their dissatisfaction could have stemmed from the challenges of adapting complex subjects and research-oriented studies to an online format.

### 3.2. Preferred Device for Learning

The sentiment distribution with respect to the preferred device for online courses, divided between mobile devices and computers, was presented in Figure 5. It was evident that a greater number of respondents using both

mobile devices and computers had reported being unhappy with their online education experience. However, a slightly higher proportion of students who preferred mobile devices expressed satisfaction compared to those who favored computers. These results could have been attributed to the accessibility and convenience that mobile devices offer, allowing for learning on the go and in various settings. Conversely, the majority of students using computers also reported dissatisfaction, although the difference between satisfied and dissatisfied users was less stark in this group. This could have suggested that while computers were typically considered better suited for online learning due to their larger screens and more robust capabilities, there were still significant challenges that needed to be addressed to improve student happiness with online education.

### 3.3. Institution Type and Satisfaction

The sentiment of students towards online education based on the type of institution they were enrolled in, categorizing them as public or private, was shown in Figure 6. The bar graph displayed a predominance of negative sentiment towards online education in both institution types, with a higher count of students expressing dissatisfaction. Interestingly, the proportion of students from public institutions who reported being happy with online education was slightly higher than that of private institutions. This distinction could have suggested that students from public institutions might have found some aspects of online education more satisfying. This might have been due to various factors such as differing expectations, resource allocation, or the nature of the student body. Public institutions often have a more diverse student population who might appreciate the accessibility and lower costs associated with online education. On the other hand, the fact that the majority of students from both public and private institutions were unhappy with online education indicated that there were overarching issues that transcended institution type. These could include the quality of online teaching methods, the effectiveness of engagement strategies, or the adequacy of technological infrastructure.

### 3.4. Discussion

The exploratory data analysis in the study provided valuable insights into students' sentiments towards online education in Bangladesh. The findings indicated a widespread trend of dissatisfaction among students, irrespective of age, gender, educational level, device preference, or institution type. This discontent underscored the need for a reevaluation of online education strategies, especially in the context of a developing country like Bangladesh. The uniform

dissatisfaction across all demographics pointed to systemic challenges in the then-current implementation of online education, such as inadequate student-teacher interaction, a lack of hands-on learning experiences, and insufficient support for emotional and mental well-being. The data suggested that these issues were common experiences for most students engaged in online education. The slight difference in satisfaction levels between students up to HSC level and those at higher educational levels hinted at younger students' potential adaptability or lower expectations but still emphasized the necessity for improvements. The preference for mobile devices over computers among some students signaled the importance of optimizing online education platforms for mobile accessibility. Additionally, the slight variation in satisfaction between students from public and private institutions highlighted the role of institutional context in shaping students' educational experiences within the common factor of online delivery.

While the findings of this study contribute valuable insights into the sentiments of Bangladeshi students towards online education, it is essential to acknowledge the study's limitations. Firstly, the research relied on self-reported data from survey responses, which may be subject to biases such as social desirability bias or recall bias. Participants may have provided responses they deemed socially acceptable or may not have accurately recalled their experiences. Secondly, the study focused on the emotional and psychological dimensions of student happiness, but did not delve into specific factors influencing satisfaction, such as the quality of instructional content, technical issues, or the availability of support services. A more in-depth investigation into these factors could provide a nuanced understanding of the challenges faced by students in the online learning environment. Thirdly, the dataset primarily represents the perspectives of students, and insights from educators or administrators were not included. Incorporating diverse viewpoints could offer a more comprehensive picture of the challenges and opportunities associated with online education in Bangladesh.

Considering the limitations, future research could take a more well-rounded approach to examining how online education affects student happiness and satisfaction. This might entail a multi-perspective analysis, gathering insights from teachers, school administrators, and education policymakers to construct a thorough picture of the hurdles and achievements of executing online learning. Additionally, forthcoming studies could delve deeper into determining the particular elements leading to student discontentment, enabling refined interventions and upgrades in digital education. This may

require probing the efficacy of instructional techniques, assessing the caliber of digital learning materials, and evaluating student access to academic support systems.

#### 4. Conclusions

This study provides a significant exploration of the relationship between online education and student happiness in Bangladesh, shedding light on the prevalent sentiments of dissatisfaction among students. The findings underscore the need for a reevaluation of online education strategies, emphasizing the importance of addressing systemic challenges such as inadequate student-teacher interaction and insufficient support for emotional well-being. While recognizing the limitations of self-reported survey data and the absence of specific factors influencing satisfaction, this study serves as a crucial starting point for further research. Future studies should take a more comprehensive approach, consolidating diverse stakeholders' viewpoints and investigating specific elements contributing to student discontent. Continuous enhancements and tailored interventions in digital education can promote the emergence of a learning setting that not only amplifies academic achievement but also sustains the holistic wellbeing and happiness of students.

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