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A Novel Study on Quality of Education Evaluation for Physical and Online Education System of Bangladesh Due to COVID.

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A thesis submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Software Engineering.

Department of Software Engineering

DAFFODIL INTERNATIONAL UNIVERSITY

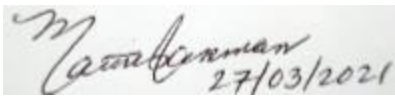
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APPROVAL

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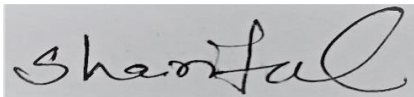
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THESIS DECLARATION

I, Borna Bhowmick hereby declare that this report has been done by me under the supervision of Md. Shariful Islam, Lecturer, Dept. of Software Engineering, Daffodil International University. We also declare that this report nor any portion of this report has been submitted elsewhere for award of any degree.

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ABSTRACT

Current COVID-19 pandemic is considered one of the main deterrents for pursuing physical education around the world. Educational institutions moved their corresponding activities onto the online platform. Since the pandemic occurred unexpectedly and abruptly, educational institutions were not prepared for this abrupt transition from physical education to online-based education. Unavailability of Internet and proper devices among the students, lack of training, and the unwillingness of the institutions in integrating a new way of providing education were the main reasons behind the less prevalence of online education in Bangladesh. This survey data was collected during the months of April 2021 to July 30 2021 when the Bangladeshi educational institutions had been officially shut down physical teaching activities due to the ongoing COVID-19 pandemic. The survey questionnaire was designed to collect data in five segments: demographic questions, devices and internet related question, physical education based question, online education based question and finally comparisons for both online and physical educational activities More than 344 undergraduate and graduate students, who are currently studying in 29 public and private universities. Besides descriptive statistics, this article also includes the results of exploratory factor analysis that potentially can serve as a good reference for future studies.

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LIST OF ABBREVIATION

O_j = Observed Frequency

E_j = Expected Frequency

E_i = Expected Value

EDA = Exploratory Data Analysis

1.1 Background:

During the COVID-19 pandemic, online learning is considered the most effective and safest way of providing education in universities. Countries, especially for the lower middle income countries, the digital transformation of higher education is bringing additional challenges. This lack of support becomes even more intense during the pandemic and crisis. According to UNESCO, 5.2 million female students are at risk of not returning to classes when the schools will reopen after the COVID-19 pandemic [1]. From an economic point of view, many students are struggling financially due to the economic damage imposed by COVID-19. In many cases, these students are unable to afford the necessary device and Internet connection for participating in online classes. These issues are causing disparities among the students and worsening their psychological condition which is already vulnerable due to COVID-19. In a low-middle-income country like Bangladesh. Bangladesh spent only 1.3% of its GDP on education [2]. This is one of the lowest education expenditure rates in the entire world. Even after increasing the spending on public education, almost 50% of the benefits are enjoyed by the people coming from the high-income group due to policy failures. Moreover, the suggestion between the education policy planned by the government and the budget allocation is extremely inadequate.

To understand the difficulties level of students are facing to participate in the online and physical learning system, an online survey was conducted among the current students.

The survey has been conducted using the online survey platform Google forms. At the beginning of the survey, a section was included to explain the objective of the study and question settings to students, and then an informed consent of the study was taken from the participants. The criteria of selecting the participants were that each participant must be a current student at a private or public university anywhere within Bangladesh Confidentiality was managed by placing anonymous coding for each self-report questionnaire. So far, more than 400 students have participated in this survey. After removing the incomplete and incorrect responses, 344 responses have been selected for data analysis. The questionnaire contains a total of 45 questions categorized into five sections: students' demographic information, devices used by students, quality of internet services at students' residences, students' ratings for online learning platforms, students resting for physical classroom activities, and student's preferences comparing between physical and online learning systems. For analysis purposes used Chi square test, T-test, ANOVA test by using SPSS, Python and Excel.

1.2 Motivation of the Research:

- ✓ The pandemic and Lockdown affected the mental health of students all over the world. Excessive screen time is causing stress, affecting sleep and other problem.
- ✓ Many student have lack of knowledge.
- ✓ Increasing students' suicide tendency.
- ✓ Impact on over all students result.

1.3 Research Question:

The survey questionnaire was disseminated among the students using participating institutions' e-mail system, and data was collected using Google form. In this dataset both numerical and categorical data were collected depending on the type of questions in the survey. The list of questions is given below:

1.4 Research Objectives:

The key goals of this thesis are given below:

- ✓ How can improve interaction and communication between teacher & student.
- ✓ Online Education how much effective for students.
- ✓ To find out the bad impact of online Education.
- ✓ How much online education impact on student result.
- ✓ To improve our education system what should we do?

1.5 Thesis Organization:

In a certain section, the whole paper is organized. Where the relevant analysis of previous work is discussed in Section 2. Those related work helps this study to find a better outcome. The Proposed methodology is presented in the section 3. I have clarified my Experimental results and final outcome in section 4 with the support of some tables and visualizations. In that section, all the outcomes have been described. A brief discussion and comparison between related work is presented in section 5. And a small summery of the whole research is presented as conclusion in section 6.

2.1 Related work:

Before COVID-19, online education in Bangladesh was mostly at the equivalent and investigational level [3]. Most of the online courses contained pre-recorded video lectures with supportive presentation slides [4]. The no interactive nature of the classes was found to be less intriguing among the students and could not motivate them to communicate with the teachers [4]. Poor Internet connection of users was another obstacle in the overall online class participation. Such pre-existing limitations intensified the significances of COVID-19 in education and made it even more difficult for the educational institutions to go online entirely. As a result, educational institutions had to go through a rapid transition. In most of the cases this transition was implemented without formulating any sustainable policies [6]. The lack of policy as well as then incapacity imposed enormous challenges on both students and teachers [5]. Many students in Bangladesh do not have the proper devices and Internet connections required to ensure their participation in online education [7]. Moreover, the economic burden imposed by COVID-19 is making it even more difficult for the students coming from low-income group to bear the additional expenses associated with online education [10]. As a result, 42 million students are considered to be affected by the consequences imposed by the COVID-19 pandemic in the education sector of Bangladesh [7]. From the very beginning of the lockdown, universities in Bangladesh have taken initiatives to continue their academic curriculum by going online [8]. However, different adversities are interrupting such initiatives of universities in making online education uniformly accessible to their students. The students are no longer able to stay at their university residence. Many of them had to go back to their family residences in village areas where there is lack of high-speed Internet connection [9]. The only alternative is to buy data packs from mobile companies. In many cases, students need to attend 2-3 classes each day which can require data packs worth 3 dollars [11]. It is nearly impossible for most of the rural students to attend online classes regularly with such overly expensive mobile data [9]. Moreover, many of these students lost their income from private tutoring, on-campus and part-time jobs due to the relocation and the lockdown [8].

2.2 Dataset Creation:

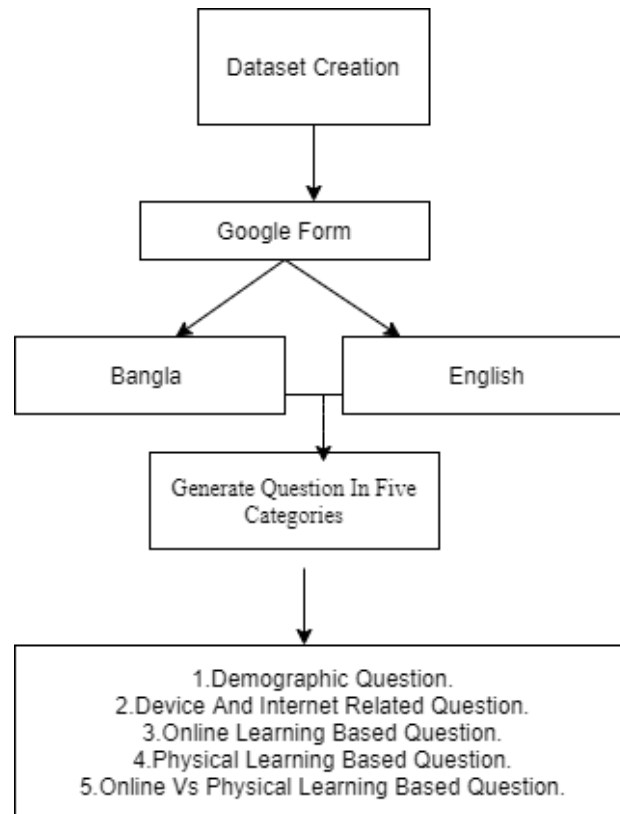


Figure 1: Workflow of Dataset Creation

2.3 Data Collection:

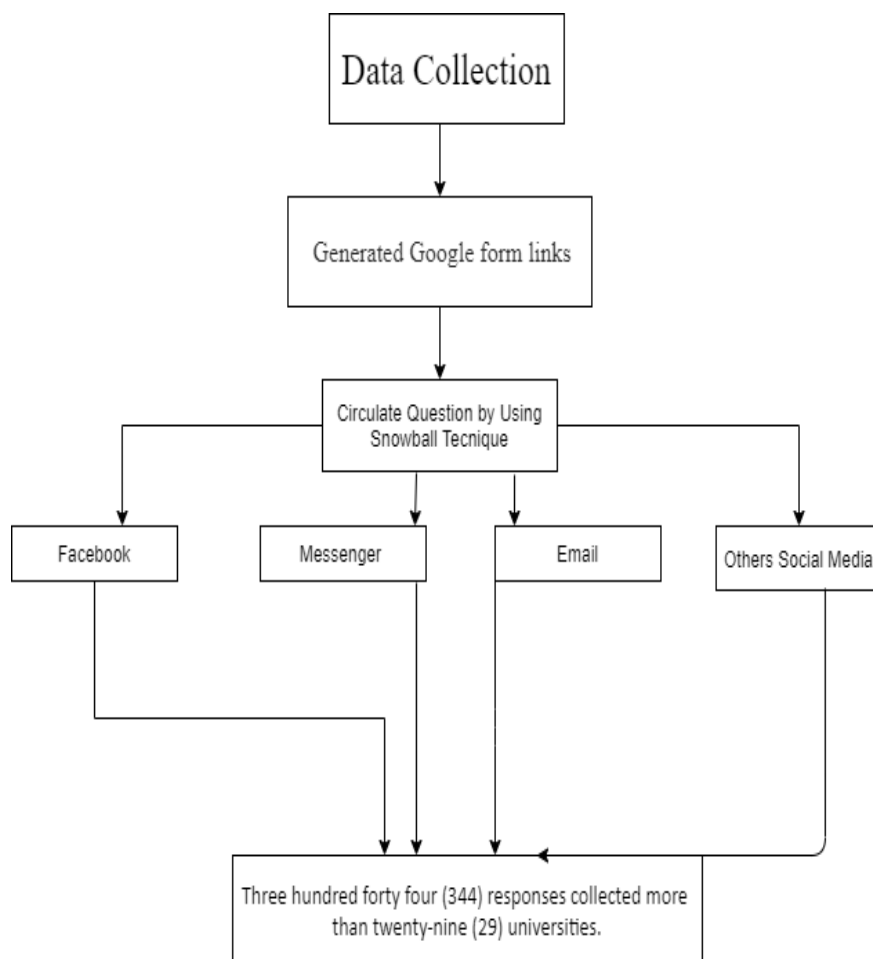


Figure2: Workflow of Dataset Collection.

3.1 Methodology:

- ✓ Chi Square Test
- ✓ ANOVA Test
- ✓ T-Test
- ✓ For Data analysis used Python, SPSS and Excel.

3.2 Data preprocessing:

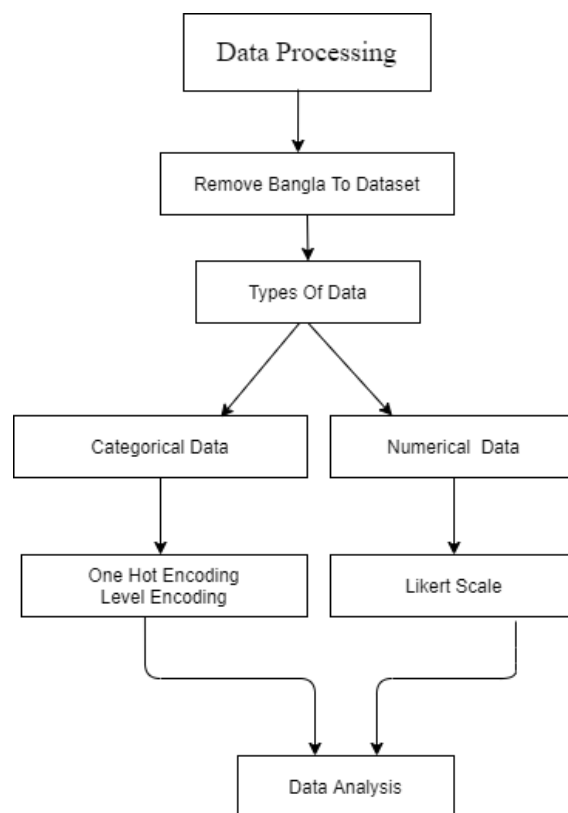


Figure 3: Workflow of Dataset Pre-Processing.

3.3 Chi-Square:

This test is a test system of statistical hypotheses and is also expressed in χ^2 . Between the value observed and the predicted value is determined. The following formula is presented.

$$\chi^2 = \sum \frac{(o_j - e_j)^2}{e_j}$$

Table 1: Chi-Square & P-value Analysis:

Variables	Categories	How many hours do you spend in the online education system daily?			χ^2	P-value
		1-2 hours	2-4 hours	4-6 hours		
Types of Universities	Private	36(12.6%)	157(54.9%)	60(32.5%)	12.302	0.00
	Public	190(50%)	125(32.9%)	65 (17.1%)		
Variables	Categories	How concerned are you about your future by participating in online learning?			χ^2	P-value
		Highly concerned	Neutral	Highly optimistic		
Types of Universities	Private	148(51.8%)	77(26.9%)	61(21.3%)	31.820	0.000
	Public	269(70.8%)	64(16.8%)	47(12.4%)		
Variables	Categories	How do teachers teach in the online education system?			χ^2	P-value
		Not Properly	Neutral	Properly		
Types of Universities	Private	63(22%)	106(37.1%)	117(40.9%)	14.605	0.006
	Public	132(34.7%)	129(33.9%)	119(31.3%)		
Types of Universities	Categories	Are all kinds of materials available online for doing lab or project related classes online!			χ^2	P-value
		Unavailable	Neutral	Available		
Types of Universities	Private	145(50.7%)	66(23.1%)	75(26.2%)	31.839	0.000
	Public	270(71%)	63(23.1%)	47(12.4%)		

CHAPTER 4: RESULT AND DISCUSSION

4.1 Experimental setting:

This survey provides user responses from public and private universities students of Bangladesh on the current educational conditions as well as students' personal evaluation about the learning system comparing the mode of teaching before the pandemic and during the COVID-19 pandemic. The survey questionnaire was disseminated among the students using participating institutions' Facebook, Messenger, E-mail and other social media data was collected using Google form. In this dataset both numerical and categorical data were collected depending on the type of questions in the survey. Numerical data were collected in the form of users' on Likert scale where a range of values from 1 to 5 were used, such that, 1 implies 'strongly disagree' or 'not satisfied,' 2 implies 'disagree,' 3 implies 'neutral,' 4 implies 'agree,' and 5 implies 'strongly agree' or 'highly satisfied.' The questions with Likert rating attempts to expose how much students are satisfied or how much students learn in the online education system. The dataset contains a total of 45 questions.

4.2 Experimental results:

Internet Satisfaction Depend on Gender And Living Condition.

In this survey only 18% male students live in urban and there approval level is Neutral for internet use. Male urban satisfaction level high only 12.5%. Female urban satisfaction level low 8.5%. Female rural satisfaction high 0.3%.

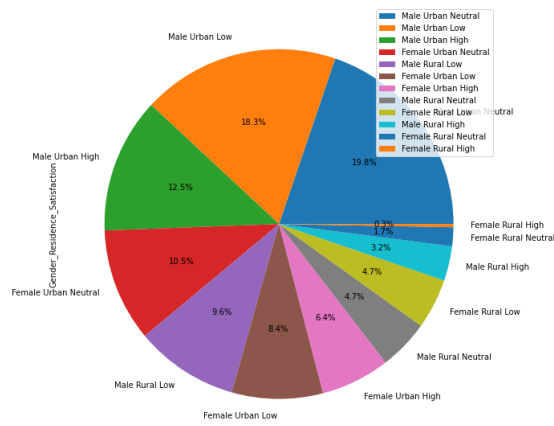


Figure 4: Pie chart for two categorical variable and one numerical variable by using EDA

4.3 Hypothesis:

How effective has online learning for rural areas students?

After the hypothesis analysis 80% students say that online education is not effective for them. Online education system effective 20% students agree with this statement.

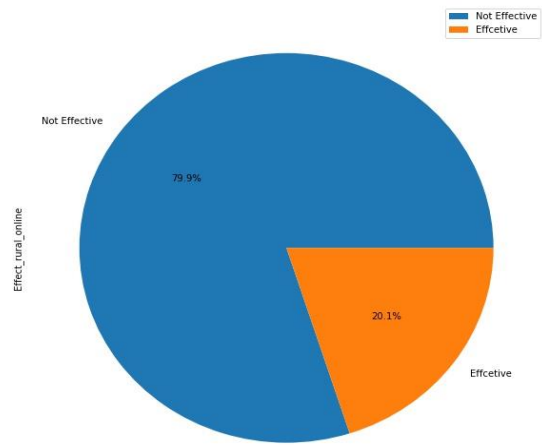


Figure5: Students Learning Hypothesis.

5.1 Discussion:

Indicates the difference between private or public University student learning conditions due to the pandemic. For finding the analysis output here, the null hypothesis (H0) is, there is no association between the type of university and how concerned you are about your future by participating in online learning, and alternative hypothesis (H1) is there is an association between these two variables. When the P-value is less than 0.05, then the null hypothesis is rejected and an alternative hypothesis is accepted. After doing the chi-square test here, the p-value is 0.00068, which is less than 0.05, so H1 is accepted. These two variables are associated. And finally demonstrated that public universities (69.9%) students are highly concerned about their futures by participating in online learning and only (13.6%) students are optimistic about their futures. In private universities (51.6%) students are highly concerned about their futures and (20.9%) students are optimistic about their futures by participating in online learning. So, Private university students are more optimistic about their futures.

CHAPTER 6: CONCLUSION

6.1 Conclusion

In this paper I have tried to demonstrate

- Conducted a survey to know the opinion of students in university on different aspects of online education during the COVID-19 pandemic.
- Finding the dependence correlation between tow or more variable.
- We should try to make physical & online education better acceptable among students.

REFERENCES

- [1] Amina Mendez Acosta and David Evans. (2020, October 02). COVID-19 and Girls' Education: What We Know So Far and What We Expect. Retrieved December 05, 2020, from <https://www.cgdev.org/blog/covid-19-and-girls-education-what-weknow-so-far-and-what-we-expect-happen>
- [2] Government expenditure on education, total (% of GDP) - Bangladesh. (n.d.). Retrieved January 18, 2021, from <https://data.worldbank.org/indicator/>
- [3] Roy, G., Roy, G., Roy, W. by G., amp; says:, M. M. R. (2020, April 7). ELearning in Bangladesh: A New Era in the Field of Education. Bangladesh Education Article. <https://bduarticle.com/e-learning-in-bangladesh-a-new-era-in-the-field-of-education/>.
- [4] Sarker, M.F.H., Mahmud, R.A., Islam, M.S. and Islam, M.K. (2019), Use of elearning at higher educational institutions in Bangladesh: Opportunities and challenges, *Journal of Applied Research in Higher Education*, Vol. 11 No. 2, pp. 210-223. <https://doi.org/10.1108/JARHE-06-2018-0099>
- [5] Emon, Efta Khairul Alif, Ashrafur Islam, M Shahanul. (2020). Impact of COVID-19 on the Institutional Education System and its Associated Students in Bangladesh. *Asian Journal of Education and Social Studies*. 11. 34-46. 10.9734/ajess/2020/v11i230288.
- [6] Esani, Muneza. (2010). Moving from Face-to-Face to Online Teaching. *Clinical laboratory science : journal of the American Society for Medical Technology*. 23. 187-90. 10.29074/ascls.23.3.187.
- [7] Bangladeshi children share experiences of remote learning and the challenges they face. UNICEF Bangladesh. (2020, December 8). <https://www.unicef.org/bangladesh/en/stories/bangladeshi-children-shareexperiences-remote-learning-and-challenges-they-face>.
- [8] Begum, Farhana Syed, Hossain, Syed Alam, Shahinul Islam, Ummay Lemon, Habjul Omar, Normah. (2020). Combating the impact of COVID- 19 on Public University Students through Subsidized Online Class: Evidence from Bangladesh. 10.7176/JEP/11-27-17.
- [9] Shama, Shafia. (2020). Education During A Pandemic: A feasibility study of online classes in Bangladesh to counteract potential study gaps caused by COVID-19 related lockdowns. 10.31235/osf.io/p6mws.

[10] Faraz Mohiuddin Choudhury. OP-ED: Can education help reduce inequality during the pandemic? (2020, August 06). Retrieved January 18, 2021, from <https://www.dhakatribune.com/opinion/op-ed/2020/08/06/op-ed-can-education-help-reduce-inequality-during-the-pandemic>

[11] Mir Mohammad Jasim, Eyamin Sajid. (2020, June 23). Costly data, poor connection key challenges for online classes in public universities. Retrieved February 03, 2021, from <https://tbsnews.net/bangladesh/education/costly-data-poor-connection-key-challenges-online-classes-public-universities>