Predicting satisfaction among the students on e-learning under the pandemic situation

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Git repo- https://github.com/sajidhahamed/CS5651_Projectdocuments

Abstract—**Covid-19 pandemic created a significant changes in day to day life of humans. Education sector can be considered as one of the mot impacted during the pandemic. Because of the pandemic students got delayed in their education and most of the student took some time to adapt to this situation. Then e-learning or online learning became an important aspect for students. Its is vital to assess the satisfaction of the student on e-learning and make improvements to deliver the teaching in effective manner. This study was conduct to identify the satisfaction level of the undergraduate students and what factors can be influenced to their satisfaction. student can be depend on lots of factors to obtain and learn continuously through e-learning platforms. on the other hand teachers also face same situation. Hence, continuous training and simple systems can be the initial steps to overcome these problems.**

Index Terms—**E-learning, Student satisfaction, COVID-19**

I. INTRODUCTION

The pandemic which starts at the end of 2019 dramatically changes the behavior of humans' daily routine life. People are forced to be inside the house and connected via online. Business looked onto e commerce, remote working introduced in almost every places and distant learning or e-learning era was begun. Earlier student chose online learning when they want to follow a course in foreign. After the pandemic school all around the world started e-learning.

Initially, students and parents were reluctant to this change. Because e-learning associated with so many external factors other than in person teaching. For example, owning a device which is capable for e-learning, accessing to a good network, other technical errors happening during the class, the environment etc. on the other hand as a positive impact, the e-learning reduce the travelling time and allow students to study at their convenience. Hence it is important to assess the satisfaction among the students on e-learning during this pandemic.

This study is to predict the satisfaction of e-learning among the students. The study is conducted by distributing a questionnaire prepared on Google form. The google form is sent to undergraduate students in various part of Sri Lanka.

The objective of this study is,

- To predict the satisfaction among undergraduate students on e-learning during the pandemic.

- To identify the factors that could influence the satisfaction of the students on e-learning.

II. LITERATURE REVIEW

A novel respiratory disease has been reported in late December 2019 in Wuhan a city of the Hubei Province of China, and it's now underlined by WHO (World Health Organization) as coronavirus disease-2019 (COVID-19) [1]. The virus continues to spread across the world and still persist around the world. More than 250 million cases reported and nearly 5 million deaths reported all over the word as of October 2021.

In order to prevent transmission of the virus I person class has been shifted to e-learning systems. This has thrown the focus on utilizing e-Learning tools and platforms for effective student engagement which may have limitations of accessibility and affordability for many students [2]. One side online teaching is providing opportunity to the students for learning another side there are various issues are attached with the new methodology of teaching. Education institutions are searching the ways to solve the issues which arose due to the lockdown and putting their efforts to fill the loss of learning [3]. A study was conducted in the National University of Malaysia at faculty of Education has reveals that on average students are satisfied with online learning. Further this study reveals the preferences of students for online learning as it provides them much freedom to connect with their teachers, students and engage with their course materials at the comfort and flexibility of their own space and time [4].

III. DATA COLLECTION AND SURVEY DESIGN

This survey was conducted via online using a google form and distributed among undergraduate via social media and other forms. Mainly via Whats-App, Facebook and other online methods.The questionnaire has two sections, where Section 1 is used to collect the demographic and other details about participants. The later section is used to get the information about e-learning and how it is impact among the students. Section two further divided into three parts.

- Learners satisfaction
- Technological impact
- Lectures/Instructors impact in e-learning.

According to the above structure questionnaire was prepared and distributed. Initially data cleaning was carried out and descriptive analysis carried out to understand the data. In order to measure the reliability Cronbach's Alpha is calculate to overall section 2 and its sub sections. Likert 5 scale measure was used to measure the satisfaction.

IV. METHODOLOGY

Data collected over a month period is used for analysis. 72 responses were taken over that period. Since the evaluation of satisfaction consist 37 question as total where Learners satisfaction, Technological impact, Lectures/Instructors has 15, 9 and 13 questions respectively. Initially descriptive analysis were carried out to understand the background of the respondents. Further Cronbach's Alpha was calculated to measure the reliability of the questionnaire.

The average ratings of the questionnaire and each sub section was calculated to identify the satisfaction level. Likert 5 scale was used to rate e questions where 5 being strongly agree and 1 being strongly disagree. As an assumption if satisfaction level is grater than 3 then we consider is as satisfied because 3 we consider as neutral.

Hypothesis were tested using the data set for mean of satisfaction levels. This is to identify whether satisfaction of e-learning affected by gender, the mode of internet connection or their year of study. For each variable comparison of mean were carried out using t-test under 5% significance level.

Below are the hypothesis tested in this study,

- Hypothesis 1
  H0: Mean satisfaction levels of male and female are equal
  H1: Mean satisfaction levels of male and female not equal

- Hypothesis 2
  H0: Mean satisfaction levels of using internet are equal
  H1: Mean satisfaction levels of using internet not equal

- Hypothesis 3
  H0: Mean satisfaction levels of year of study are equal
  H1: Mean satisfaction levels of year of study not equal

V. ANALYSIS AND RESULTS

A. Descriptive Analysis of the respondents

A total of 72 response were collected over a month period. The questionnaire was undergraduates around Sri Lankan universities. Figure 1, shows the gender distribution where 66.7% are Female. Also it has been noted that among the respondents fist year students are in majority. According to the Figure 2, 44 respondents are in first year while 9, 8 and 11 students from second third and fourth year respectively. Undergraduates from 16 institutions responded where 61.1% are from the University of Colombo. Respondents were from 16 districts where Kandy has 18 responses as highest and Colombo has 16 as next. Then Kegale, Kurunegala and Matara follows with 7 responses each.

Based on Table 1, 16.7% of the respondents who rely on the mobile data while majority use either WIFI only or
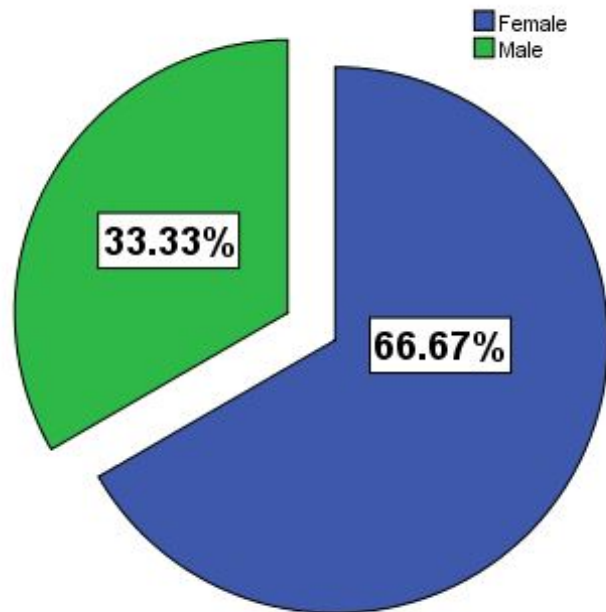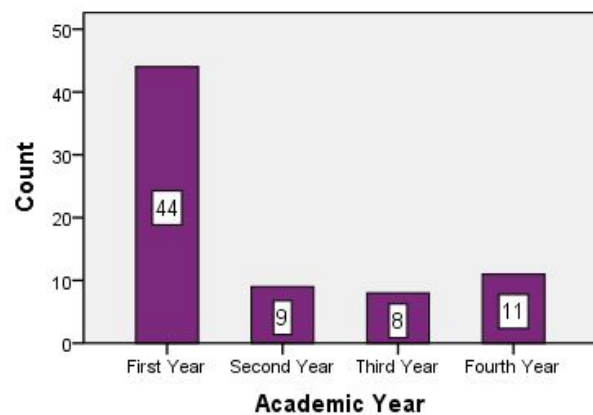

Fig. 1. Gender distribution

Fig. 2. Academic year distribution

combination of WIFI and Mobile data. According to Figure 3 it can be seen that the students who live where infrastructure is developed mostly uses WIFI for their online activities. Whilst students in Anuradhapura and Trincomalle uses only the mobile data.

B. Advance analysis on Satisfaction level

Initially Crobach's alpha was calculated for the overall questions and each subsections.Theoretically, Cronbach's alpha results should give a number from 0 to 1 but can get negative numbers as well. A negative number indicates that something is wrong with data. However higher values of alpha are more desirable. Some professionals, as a rule of thumb,

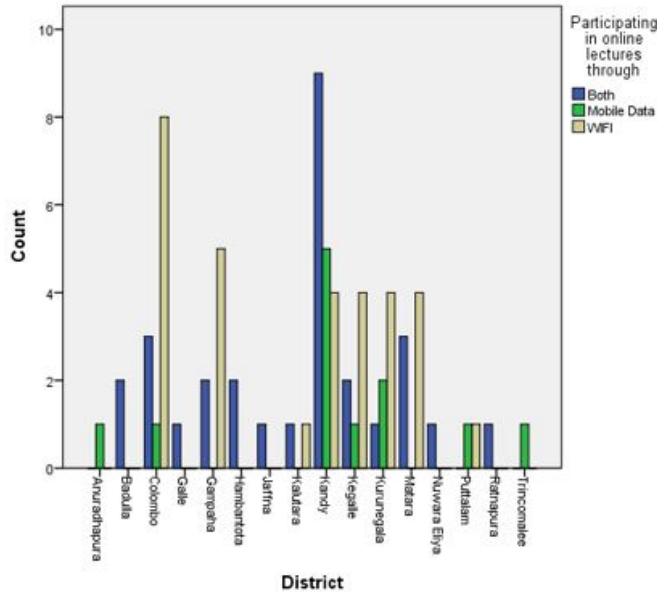| Mode of internet usage	Percentage
Mobile data	16.67%
WIFI	43.06%
Both	40.28%

Fig. 3. Mode of Internet usage by district

require a reliability of 0.70 or higher with 0.60 as the lowest acceptable threshold. Cronbach's alpha will generally increase as the inter-correlations among test items increase and is thus known as an internal consistency estimate of reliability of test scores.

Table 2 indicates the Chronbach's alha results.Cronbach's Alpha of total 37 questions is 0.914 which indicates the reliability of the questionnaire.All of the sub sections also give Cronbach's Alpha of greater than 0.79.

Factor	Percentage	Number of Questions
Factor 1 – learners perspective	0.894	15
Factor 2 – technological impact	0.79	9
Factor 3 – lectures impact	0.931	13
Ovrall	0.931	37

The mean satisfaction levels of gender, mode of internet use and year of study were compared to identify whether there is any difference in satisfaction level. Then mean level of satisfaction were compared using t-test. Hypothesis results of all three test are not significant which indicates that the mean level of satisfaction on variables like Gender, mode of internet usage and year of study does not significantly differ.

According to the Table 3, mean satisfaction of male and female dos not significantly differ (p-0.237 is greater than 0.05). Similarly, man level of academic year and mode of internet usage are not significantly difference.

Test	P-Value
Hypothesis 1	0.237
Hypothesis 2	0.838
Hypothesis 3	0.498

Likert 5 scale measure was used to assess the satisfaction of students. Table 4, indicates the average ratings of each category and overall mean satisfaction level. According to the Table 4, the sample has 3.7164 as a overall rating which is in favour of students are satisfied with the e-learning during this pandemic. Moreover learners perspective section showing a least value of rating which can be because of the student are not familiar with the technology or having difficulties in adapting to the system.However the less number of sample does not provide an accurate inference hence increase the sample size would lead to more accurate results.

Section	Average Ratings
Factor 1 – learners perspective	3.4417
Factor 2 – technological impact	3.7130
Factor 3 – lectures impact	3.9947
Overall	3.7164

VI. DISCUSSION AND CONCLUSION

Respondents were request to response about their satisfaction level of e-learning under 3 category. Demographic information also collected to identify the background of the student. It is noted that students from less developed area mostly uses mobile data while those who live in urban area or surrounding tends to use WIFI. Collected response were used to calculate Cronbach's Alpha and check the reliability of the questionnaire.

Based on the simple average of rating indicated in Table 4 has shown that the students are satisfied with the e-learning during this pandemic situation. But it is noticed that the data has bias in it, as most of the students are from urban and suburbs. Hence the study could be further extended to cover the wide range of undergraduates.

E-learning system and its usage should be assessed frequently for the betterment of the students. The satisfaction can be measured in ch aspects separately to identify in which aspect students are satisfied most and least. Whether you like it or not each person needs to adapt to the e-learning. Education institute should educate their students on using the technologies and provide systems with minimal complexity.

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