Predicting Satisfaction Among the Students on E-learning Under the Pandemic Situation

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Abstract— **E-learning under the Covid-19 pandemic situation is very useful for the students to conduct their studies smoothly without visiting the universities and is quite popular nowadays as the education system with the current situation in the world. Although e-learning platforms were established for the students there are some concerns among the students regarding newly implemented platforms within the country. Hence, it is an essential factor of ensuring quality of the education under these special circumstances. A questionnaire was carried out using undergraduate students who use an e-learning platform as respondents and the results were analyzed to identify the satisfaction among the students regarding e-learning under the pandemic situation and to find out main reasons behind some dissatisfaction of some students in Sri Lanka who are using e-learning.**

Keywords—e-learning, pandemic, satisfaction

I. Introduction

The word e-learning defines the learning system based on formalized teaching with the help of electronic resources. This system became the most popular education medium overall the world with the outbreak of the pandemic Covid-19. With regard to the health policies and regulations related to maintaining considerable physical distance in order to avoid transmission of the Covid-19 virus, the Sri Lankan government also decided to conduct education through the e-learning method instead of face-to-face traditional learning method. Therefore, evaluation of such a newly introduced e-learning method within the country is essential to ensure the successfulness of the education of the students. So, predicting satisfaction among the students on e-learning under the pandemic situation is one of the major research questions nowadays.

Quality of e-learning will be dependent on many factors like age group, internet facilities, etc. This research was conducted by targeting university undergraduate students who are currently studying through the e-learning platform. Hence this questionnaire is prepared based on the expectations and satisfactions of the university undergraduate students towards the education system in the university life. Those details will be discussed in detail under the methodology section.

The questionnaire prepared for the survey was distributed among the undergraduates who are using the online education system as the medium of their education in Sri Lanka through an online Google form. Here a total 71 responses could be collected from the university students from various areas of the country. This survey is conducted voluntarily on undergraduate students by giving the overall picture of the survey with their full consent. Here no personal detail was collected from the students. Furthermore, the questions were decided based on the easiness and understandability. Hence, throughout the questionnaire only multiple-choice answers, multiple choice grids, drop downs, linear scales were presented as the answering mode.

From the analysis of the collected data some correlations could be found among different factors. Considering those factors, higher authorities can take necessary steps and actions to provide the most satisfactory education medium all over the country.

II. Methodology

A questionnaire was created using a google form based on the factors related to the satisfaction of e-learning. First this was distributed among 3 of my friends and got feedback related to the questionnaire. Then this was distributed among undergraduate students through mine relations, friends and office colleagues.

A. Questionnaire

The questionnaire collected some demographic features of the respondent and some more details like student's internet facilities, level of satisfaction regarding lecture's teaching methods and availability, student interaction, etc. The factors that are considered throughout the questionnaire as follows.

1. **What is your gender?**

   Multiple choice answer was given to select whether male or female

2. **What is your university?**

   Names of the Sri Lankan universities were listed down in a drop down

3. **What is your field of specialization?**

   Names of the fields of specializations were listed down in a drop down

4. **Where do you live?**

   Names of the districts were listed down in a drop down

5. **What is the monthly income of your family?**

   Five income level ranges were provided as a multiple-choice answer

6. **How many hours do you spend on e-learning per week?**

   Four hours ranges were provided as a multiple-choice answer

7. **Who is your internet service provider?**

List of internet providers were listed down in a drop down

8. **How about the internet connection?**

Four satisfaction status were given as a multiple-choice grid for the internet connection.

9. **How many months are you studying through e-learning?**

Three months ranges were given as multiple-choice answers

10. **Lecturers' details in online sessions**

Five agreement level status was given as a multiple-choice grid for the aspects of presentations that were clear and organized, stimulated student interest, effectively used time during online lectures and lecturer was available and helpful.

11. **Course content in online sessions**

Five agreement level status were given as a multiple-choice grid for the aspects of learning objectives were clear, course content was organized and well planned, course workload was appropriate and course organized to allow all students to participate fully.

12. **Level of practical knowledge you gain through e-learning**

Five levels of linear scale were used by mentioning 1 as least gained and 5 as most gained.

13. **Level of satisfaction regarding engagement with extra-curricular activities during e-learning process (Eg: Gavel Club, AIESEC, Chess etc.)?**

Five levels of linear scale were used by mentioning 1 as least satisfied and 5 as most satisfied.

14. **Level of satisfaction regarding interaction with batch mates during e-learning**

Five levels of linear scale were used by mentioning 1 as least interaction and 5 as frequent interaction.

15. **Level of satisfaction regarding conducting online exams and assignments. (Eg: Internet connection loss, paper is not in the hand, background distraction, regarding facilities like web cameras)**

Five levels of linear scale were used by mentioning 1 as least satisfied and 5 as most satisfied.

16. **Do you get enough time for the completion of online exams/assignments?**

Two multiple-choice answers were given as "Yes" and "No"

17. **Do you get what you expect as an undergraduate through e-learning?**

Two multiple-choice answers were given as "Yes" and "No"

18. **Are you comfortable with the process of the conduction of e-learning?**

Two multiple-choice answers were given as "Yes" and "No"

19. **Overall, how satisfied are you with the e-learning platform?**

Five levels of linear scale were used by mentioning 1 as least satisfied and 5 as most satisfied.

20. **Do you prefer e-learning over traditional learning methods (being at university)?**

Two multiple-choice answers were given as "Yes" and "No"

B. Data Collection

Total number of 71 responses were collected and all the answers were collected responses were taken to a CSV file using the google form responses. As all the questions are marked as required no missing values were found. Using the CSV file, collected data was analyzed for further predictions.

III. RESULTS

Following graph shows the descriptive analysis regarding the e-learning based on various factors that affect the satisfaction of the students regarding the e-learning.
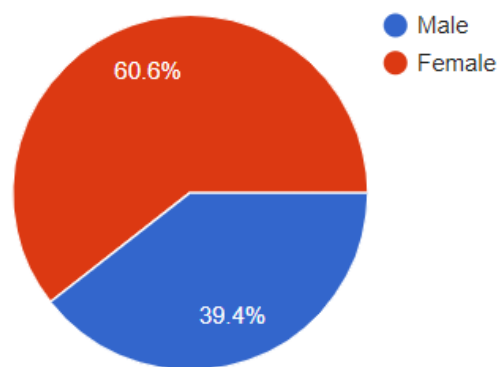

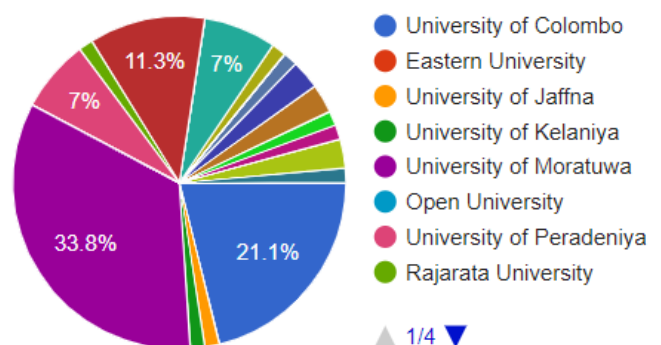Figure 1 - Gender distribution

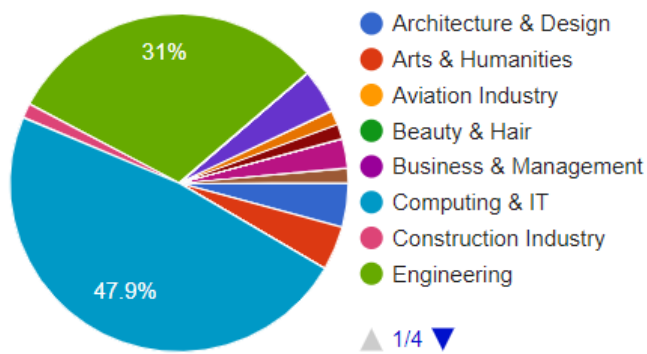Figure 2 - University distribution
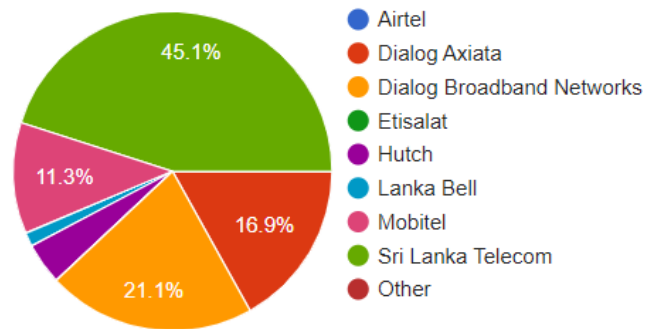
Figure 3 - Field of specialization distribution

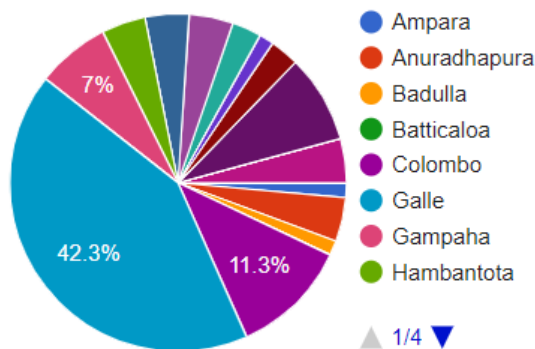Figure 7 - Internet providers distribution
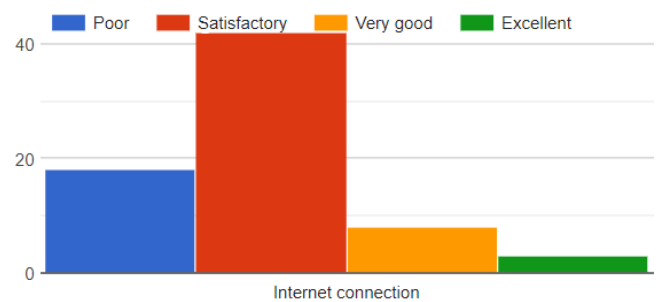

Figure 4 - Living district distribution

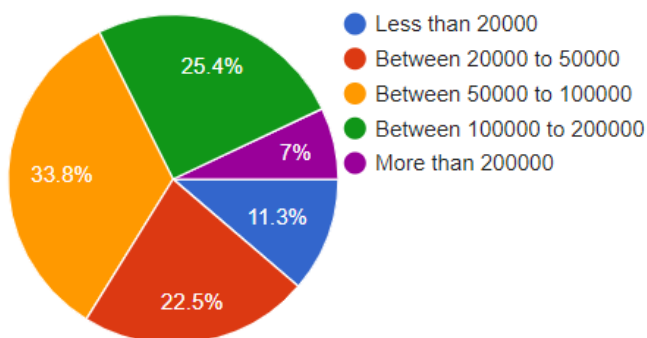Figure 8 - Internet connection distribution
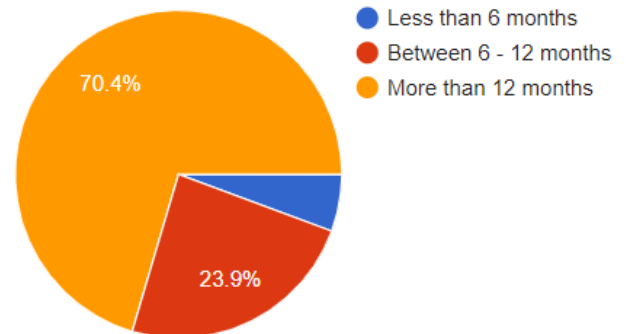

Figure 5 - Income level distribution

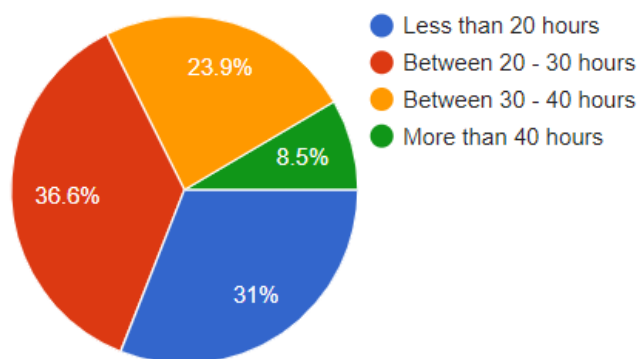Figure 9 - Months studying through e-learning distribution

Figure 6 - Time spent on e-learning distribution
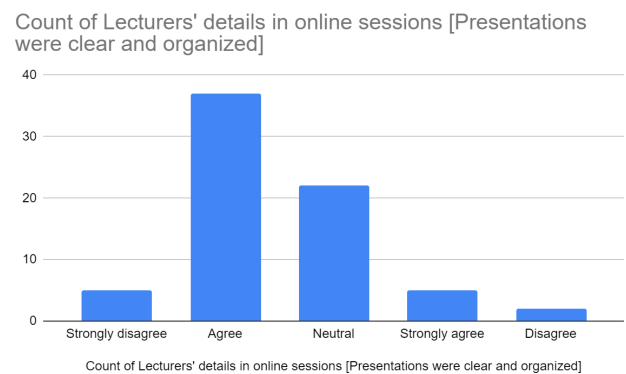

Figure 10 - Lecturers' details in online sessions distribution - Presentations were clear and organized
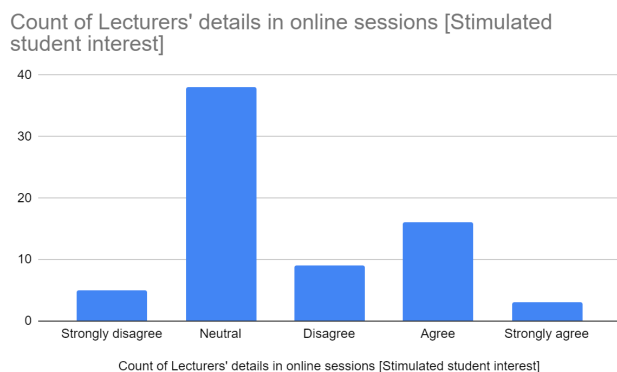
Figure 11 - Lecturers' details in online sessions distribution - Stimulated student interest
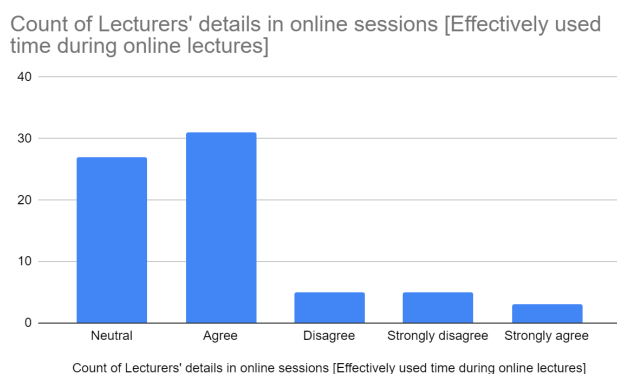
Figure 12 - Lecturers' details in online sessions distribution - Effectively used time during online lectures
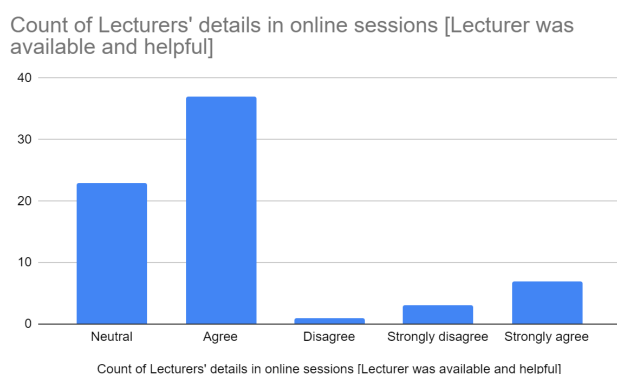
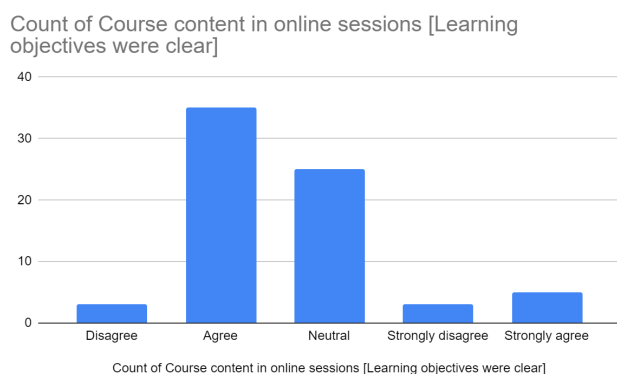Figure 13 - Lecturers' details in online sessions distribution - Lecture was available and helpful

Figure 14 - Course content in online sessions distribution - Learning objectives were clear
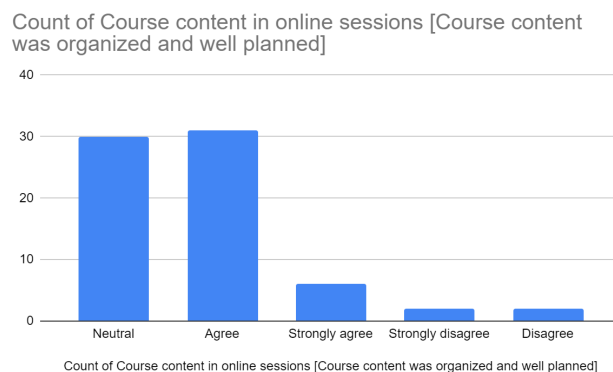

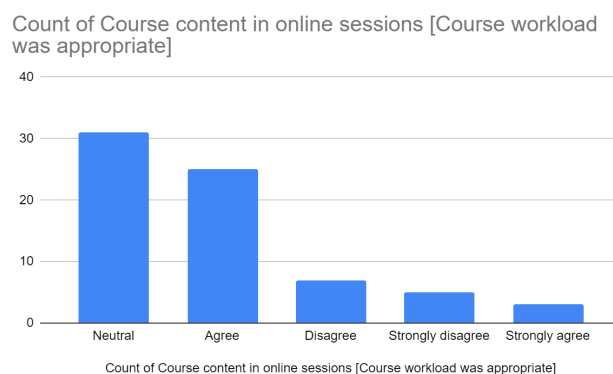Figure 15 - Course content in online sessions distribution - Course content was organized and well planned

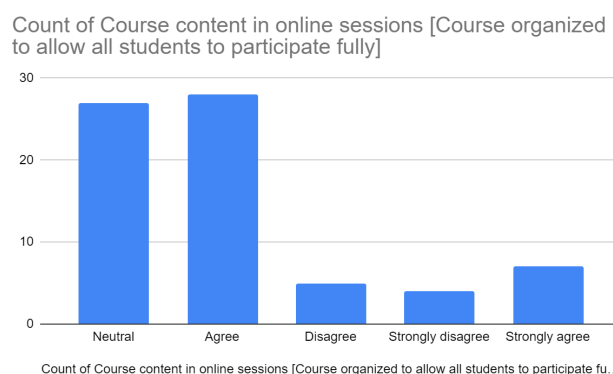Figure 16 - Course content in online sessions distribution - Course workload was appropriate

Figure 17 - Course content in online sessions distribution - Course organized to allow all students to participate fully
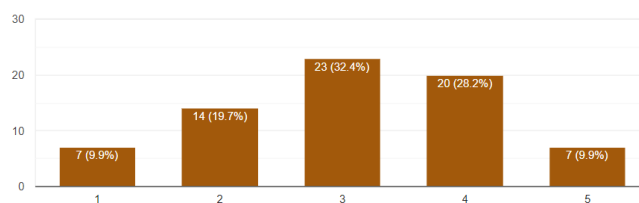

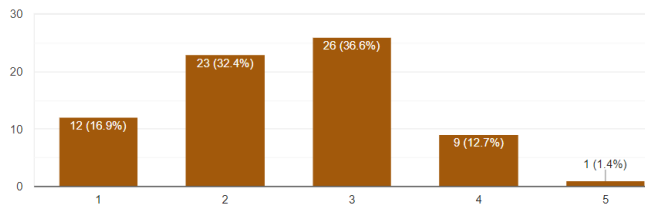Figure 18 - Level of practical knowledge gain from e-learning distribution

Figure 19 - Level of satisfaction regarding engagement with extra curricular activities during e-learning process distribution
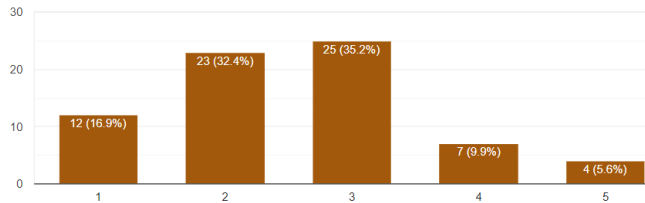

Figure 20 - Level of satisfaction regarding interaction with batch mates during e-learning distribution
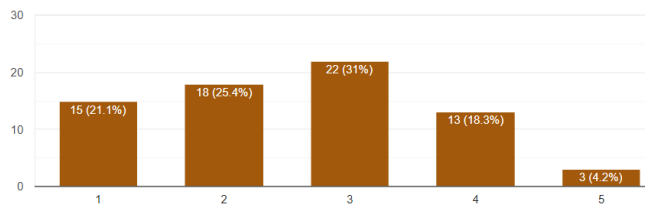

Figure 21 - Level of satisfaction regarding conducting online exams and assignments distribution
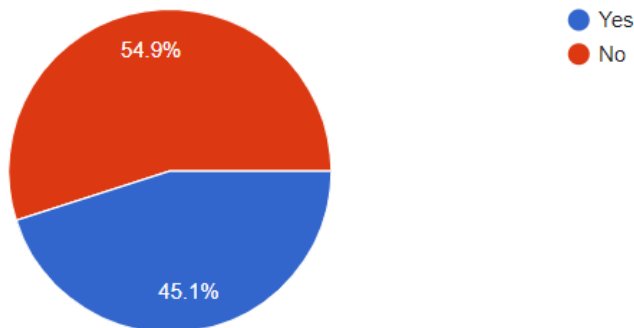

Figure 22 - Get what you expect as an undergraduate through e-learning distribution
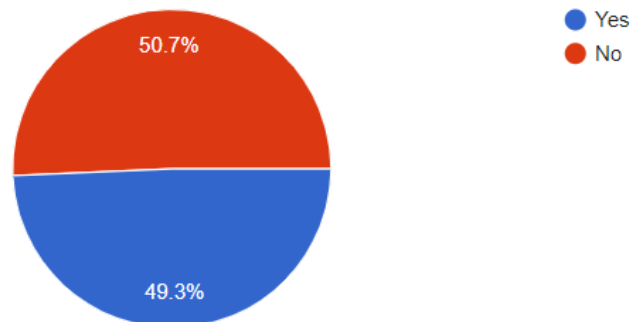

Figure 23 - Comfortable with the process of the conduction of e-learning distribution
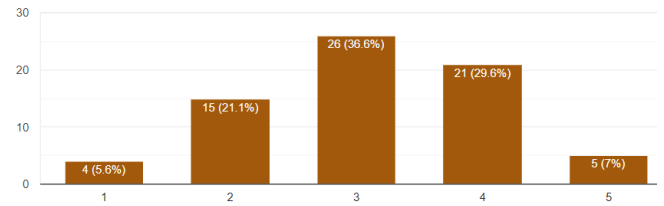

Figure 24 - How satisfied are you with the e-learning platform distribution

IV. ANALYSIS

Interesting patterns and correlations could be identified among satisfaction towards the given time for online exams and assignment and satisfaction towards e-learning from the conducted analysis.
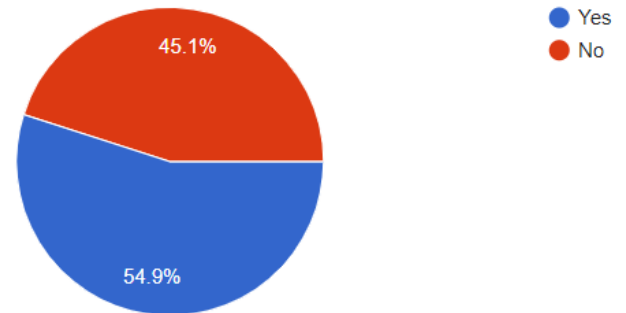

Figure 25 - Satisfaction towards the given time for online exams and assignment distribution
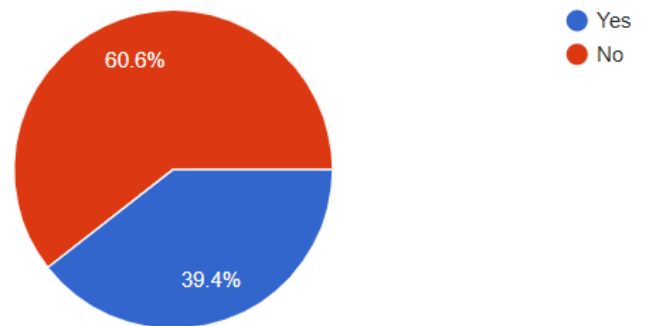

Figure 26 - Satisfaction towards e-learning distribution

A. Hypothesis Testing

For the analysis, hypothesis testing was conducted on the alternative hypothesis "Is satisfaction towards e-learning not caused by students' satisfaction with the given time for online exams and assignments?". Null and alternative hypothesis defined as follows.

p_e : *propotion of student* satisfaction towards e-learning = 0.352

p_o : *propotion of student* satisfaction towards the given time for online exams and assignment = 0.549

$H_0 : p_e = p_o$

$H_e : p_e \neq p_o$

$p_e - p_o = -0.197$

Original and randomized samples taken for the analysis as follows.

TABLE I.   ORIGINAL SAMPLE FOR HYPOTHESIS TESTING

Group	Count	Sample Size	Proportion
G1	25	71	0.352
G2	39	71	0.549
G1 - G2	-14	n/a	-0.197

TABLE II.   RANDOMIZED SAMPLE FOR HYPOTHESIS TESTING

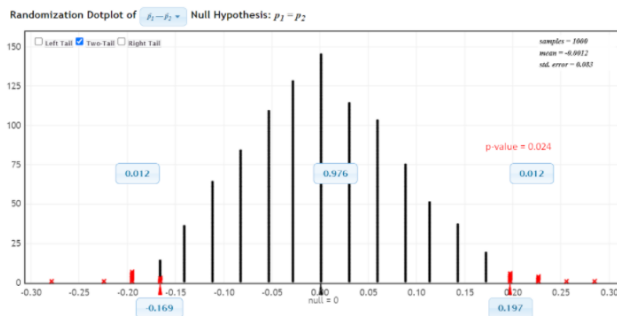| Group	Count	Sample Size	Proportion
G1	39	71	0.549
G2	25	71	0.352
G1 - G2	14	n/a	0.197

Figure 27 - Randomized dotplot for null hypothesis

As p-value is 0.024 for the tested hypothesis which is lower than the significance level, here we can reject the null hypothesis and accept the alternative hypothesis that we assumed as shown in the dot plot of figure 27.

V.   CONCLUSION

The goal of this study was to predict student satisfaction with E-learning in the face of the Covid-19 epidemic. Student satisfaction could be influenced by a number of factors. We were able to establish a link between student satisfaction on e-learning and given time for online exams and assignments, based on the findings of data analysis performed on completed online survey responses. According to the findings of the hypothesis test, student satisfaction with e-learning is dependent on their satisfaction regarding the given time for online exams and assignments.

GitHubRepo:https://github.com/rangikass/e-learning-stat

REFERENCES

[1]   "StatKey," [Online]. Available:https://www.lock5stat.com/StatKey/.