

Students' appraised family and friends' support and e-learning engagement of undergraduates in Sri Lanka

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Abstract— Due to the disordering caused by the COVID-19 pandemic, the higher education institutions across the world moved to e-learning. This sudden disruptive shift to e-learning originated many sociological and mental changes in students' life, even though e-learning provides an uninterrupted study environment on due course. This study aimed at examining the impact of students' appraised family and friends' support for the e-learning engagement among Sri Lankan undergraduates. The interesting insight on gender-based engagement in e-learning activities with family and friends' support is obtained.

Keywords— *E-learning, Family support, Friends' support, hypothesis testing, two-tailed t-test*

I. INTRODUCTION

Due to the pandemic situation, distance learning methods are introduced to the students from kindergarten to university. It is an obvious fact that kindergarten students need the guidance of a parent or guardian for the process unlike undergraduates. For them, the negative emotions arise due to social isolation such as boredom, anxiety, frustration etc. This study focuses on investigating the influence of the family and friends support for the e-learning engagement of undergraduates in Sri Lanka.

This report is a descriptive and hypothesis analysis that is carried out with the survey dataset collected

through online methods. First, several descriptive analyses are carried out based on the demographic features of the sample such as gender, living area, Year of the study at the university, Name of the university, Undergraduate stream etc. Then, based on the responses that the audience have given a hypothesis was tested to identify whether there is an gender-based impact on motivating the e-learning engagement of females with family and friends' support which were the initially set objectives of the survey. All the documents including the dataset, python and R codings and a readme about data can be found in the [Git repository](#).

II. STATISTICAL INFERENCE

A. Introduction to Statistical Inference

Statistical Inference is the process of inferring parameters of an underlying probability distribution via data analysis unlike descriptive statistics which rely on the process of collecting and analyzing descriptive statistics, which is a summary statistic that mathematically describes or summarizes features from a collection of data.

B. Outcome of the project

Survey was done with the alliance of university undergraduates to collect data related to applications of e-learning satisfaction and friends and family support. Demographic data are analyzed using python and hypothesis testing was done using the R programming

language. Interesting insight was found that females are more likely to be motivated if they have friends and family support.

III. METHODOLOGY

This section of the report describes all of the processes that were completed, the tools that were utilized to complete the project, and the consequences of each step.

A. Data Gathering

The study used a structured questionnaire using a *Google Form* where the respondents were asked to fill it. The questionnaire is about to be prepared according to the standard guidelines. The expected completion time was 5 minutes. The questionnaire was divided into three parts.

Part one: Six questions of demographic information namely; Gender (male or female) , Living area (rural, semi-urban, urban), Year of study at the university from year 1 to year 6, Name of the university as a mix of both state and private universities, undergraduate streams including Engineering & IT (Computer Science), Physical sciences, Medicine, Nursing, Veterinary and Allied Health, Business Management and Commerce, Visual and Performing Arts etc. It is also considered the location where they are engaged in distant learning activities (home-base, relative's house, friend's house or other specific place). It was interesting to know whether they have any prior experience in attending lectures and collaborating with students and staff on campus before pandemic.

Part two consists of three sections. First section includes the matrices to define the family support while the second section consists of the matrices to measure the friends support on e-learning activities. The third and the final section was allocated to ask their opinion on e-learning experience in general such as how many hours

per day they are engaged with e-learning platforms. Rates on the effectiveness of remote learning have been for them, Opinion rating on how much they think that the family support and friends' support contributes to their e-learning engagement.

Matrices to identify Family support:

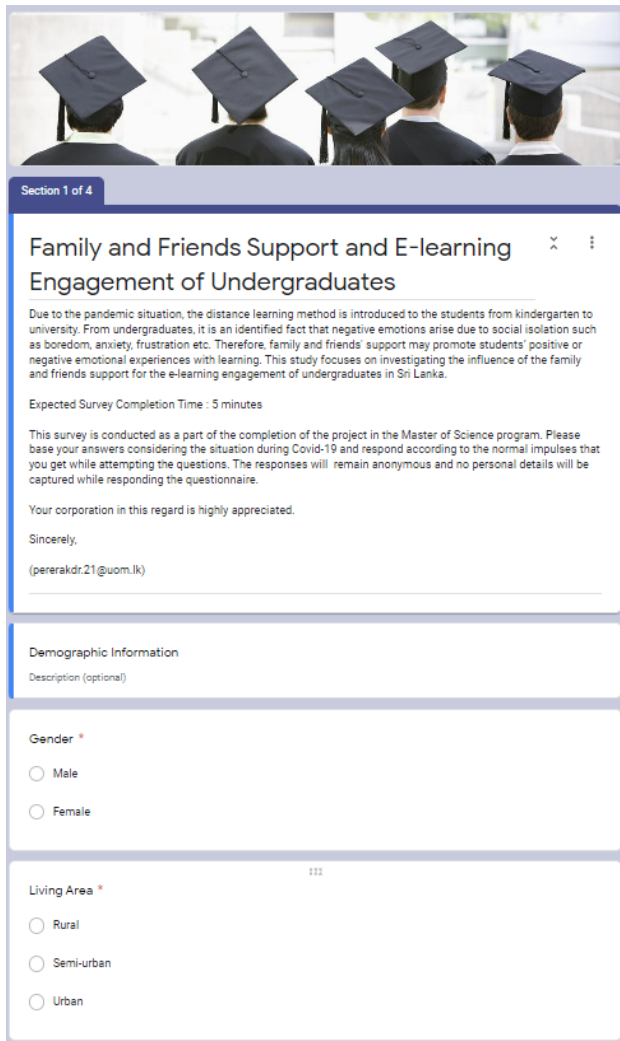
- Having a separate area to engage in e-learning activities
- Having an uninterrupted environment to engage in academic activities
- Family being able to facilitate the technological requirements and services that are required for distant learning
- Family encouragement on studies
- Satisfaction with the current family support regardless the above factors

Matrices to identify friends' support:

- University colleagues be contacted whenever needed during the distant-learning period
- Friends' encouragement on studies
- Support for the academic activities
- Satisfaction with the current support regardless the above factors

Above mentioned attributes are included in “**Google Forms**” that can be accessed via [this link](#).

The method of data collection was sharing this link with peer groups and colleagues using “WhatsApp” and other social media. 166 responses are obtained from the questionnaire to be used for the descriptive and inferential analysis. Then responses have been downloaded in .csv format which is also included in the Git-Repo. Following image shows a snapshot of the Questionnaire.



Section 1 of 4

Family and Friends Support and E-learning Engagement of Undergraduates

Due to the pandemic situation, the distance learning method is introduced to the students from kindergarten to university. From undergraduates, it is an identified fact that negative emotions arise due to social isolation such as boredom, anxiety, frustration etc. Therefore, family and friends' support may promote students' positive or negative emotional experiences with learning. This study focuses on investigating the influence of the family and friends support for the e-learning engagement of undergraduates in Sri Lanka.

Expected Survey Completion Time : 5 minutes

This survey is conducted as a part of the completion of the project in the Master of Science program. Please base your answers considering the situation during Covid-19 and respond according to the normal impulses that you get while attempting the questions. The responses will remain anonymous and no personal details will be captured while responding the questionnaire.

Your corporation in this regard is highly appreciated.

Sincerely,
(pererakdr.21@uom.lk)

Demographic Information

Description (optional)

Gender *

☐ Male

☐ Female

Living Area *

☐ Rural

☐ Semi-urban

☐ Urban

Figure 1: Google form questionnaire

B. Importing Data and Data Cleansing

The data from the Google Form is downloadable as an Excel file. The data was then pre processed to suit the analysis. First the answers in lickers scale were converted into numeric format. They were mapped into numerals between 1 to 3 (No, Not specifically and Yes) with 3 being the highest values or “Strongly Agree”.

Some of the answers were in the Yes/ No format and numerals rating into 5. These were mapped to 1, -1 and 0 respectively. This later helped in evaluating the disparity between the yes, no classes easily. Then the average score of the matrices were taken as the measure to indicate the family support and friends support. Therefore, two new

features are introduced as family support score and friends support score to be applied to the t-test.

Once the data formatting was handled, the next pre-processing step involved filling out the missing values. There were no missing values included in the study as all fields were made mandatory in the survey.

Once the data was cleaned, encoded and transformed, descriptive statistics about the data were generated in order to better understand the data. The analysis part has been carried out with “Python” language using “[Google Colab Notebook](#)”.

Afterwards, a null and alternative hypothesis was defined in order to test whether there is a gender-based impact for the e-learning engagement with friends and family support. All the data are loaded to the R studio and applied to the Two Sample T-test on gender and satisfaction scores. It is assumed that the data are normally distributed and the distribution plots were conspired.

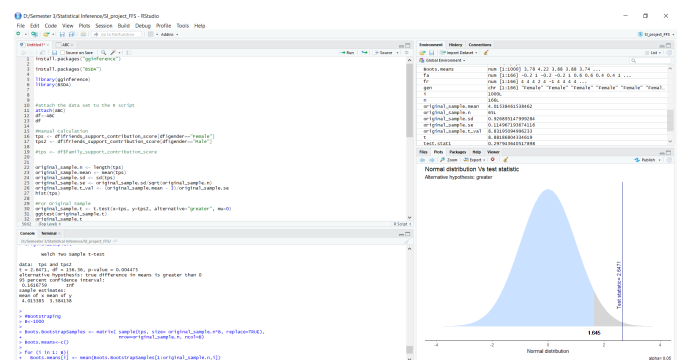


Figure 2: R-studio analysis

C. Descriptive Analysis

a. Gender Distribution

It was observed that the majority of the respondents were male.

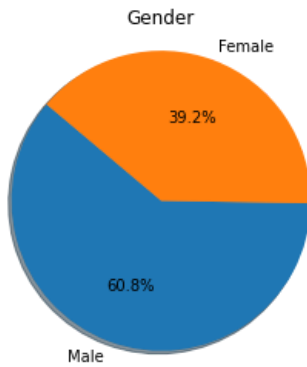


Figure 3: Pie chart illustration based on gender

b. Living Area

Half of the respondents were from semi-urban neighborhoods while the number of participants from rural areas were half of that of urban.

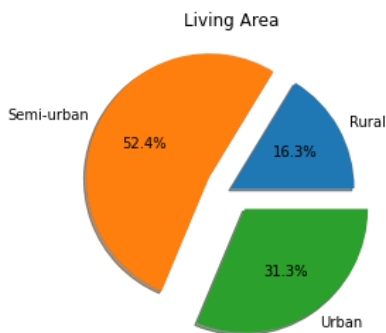


Figure 4: Pie chart illustration based on living area

c. Year of Study at the University

Majority of respondents are second and first years.

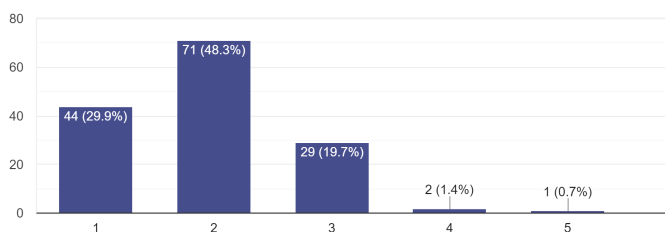


Figure 4: Bar chart illustration based on year of study at the university

d. E-learning engagement hours per day

Majority spent five to seven hours using e-learning platforms and it is about 32.7%

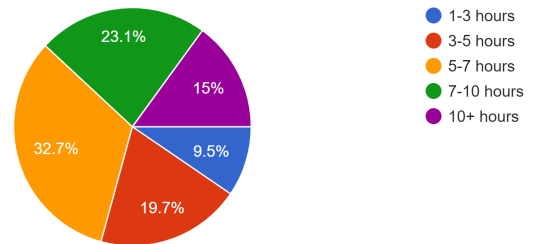


Figure 4: Pie chart illustration based on e-learning hours per day

e. Universities of the participants

68% of the respondents are from the University of Colombo and the majority represents state universities.

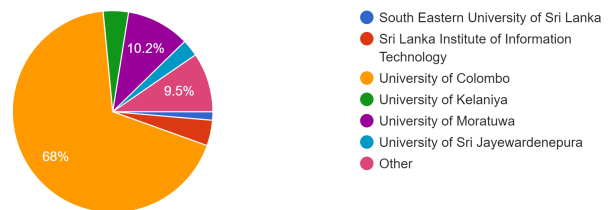


Figure 5: Pie chart illustration based on university

f. Undergraduate learning stream

Most of the respondents are Engineering, IT or Computer science undergraduates.

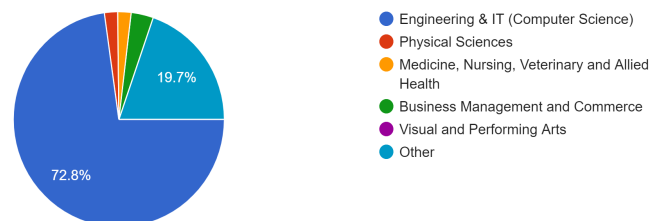


Figure 6: Pie chart illustration based on learning stream

g. Location of e-learning engagement

Majority of the undergraduates are able to take part in e-learning activities while staying at home.

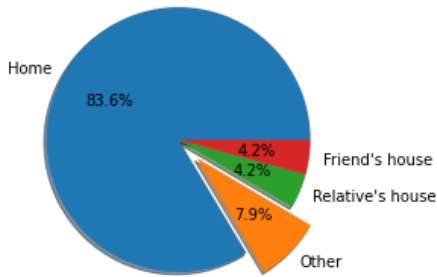


Figure 7: Pie chart illustration based on distant learning location

h. Proportion of attendance to the physical lectures

More than half of the collected sample have never been to the university to attend lectures and collaborate with friends and academic staff.

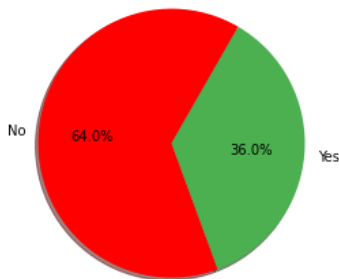


Figure 7: Pie chart illustration based on attendance for lectures on campus before pandemic

i. Rate for the distance learning experience

Majority has a moderate satisfaction on the effectiveness of e-learning experience.

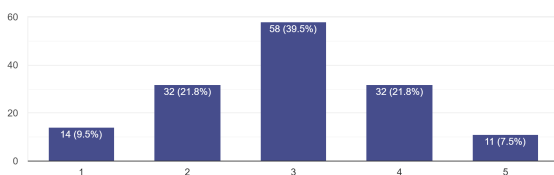


Figure 8: Bar chart illustration based on distance learning satisfaction

j. Importance of family support for the e-learning engagement

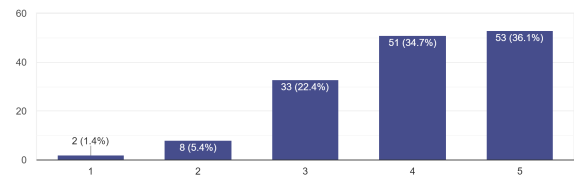


Figure 9: Bar chart illustration based on distance learning satisfaction

k. Importance of family support for the e-learning engagement

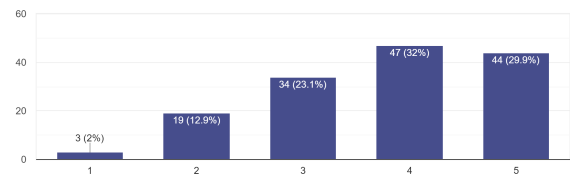


Figure 4: Bar chart illustration based on distance learning satisfaction

D. Hypothesis Testing

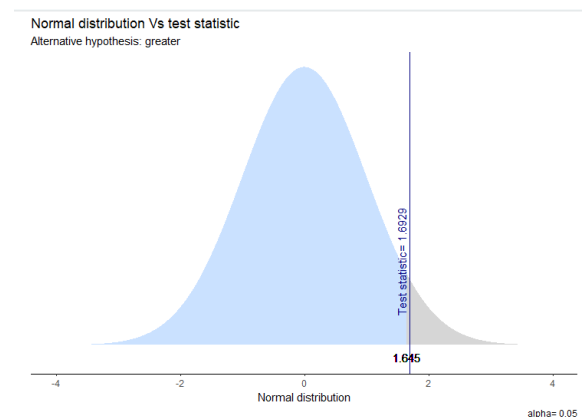
Two hypotheses were tested based on gender-base motivation for the e-learning engagement with the support of family and friends.

I) IMPACT OF FAMILY SUPPORT FOR E-LEARNING ENGAGEMENT ON GENDER

H01: Positive impact on motivating the e-learning engagement of female with family support has no difference from its male parameter ($H01: \mu_f - \mu_m = 0$)

Ha1: Positive impact on motivating the e-learning engagement of female with family support is greater than of its male parameter ($H01: \mu_f - \mu_m > 0$)

where μ is the mean value of the satisfaction score of the relevant gender.



Welch Two Sample t-test

```
data: tps and tps2
t = 1.6929, df = 144.24, p-value = 0.04632
alternative hypothesis: true difference in means is greater than 0
95 percent confidence interval:
 0.00548748      Inf
sample estimates:
mean of x mean of y
 4.169231  3.920792
```

P-value < $\alpha = 0.05$; P-value = 0.0463
Therefore, Reject H0

Conclusion based on result:

We do not have enough evidence to say that positive impact on motivating the e-learning engagement of females with family support has no difference from its male parameter.

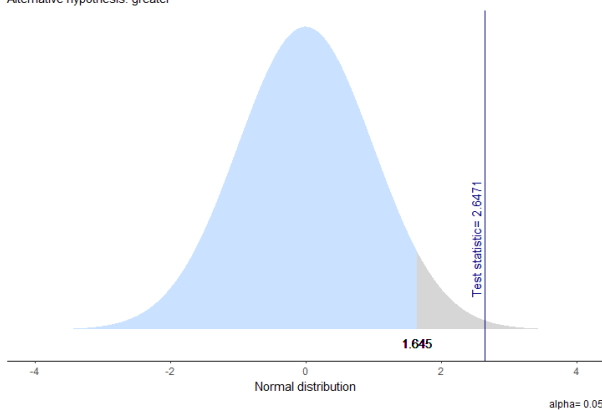
II) IMPACT OF FRIENDS' SUPPORT FOR E-LEARNING ENGAGEMENT ON GENDER

H02: Positive impact on motivating the e-learning engagement of female with friends' support has no difference from its male parameter (H02: $\mu_f - \mu_m = 0$)

Ha2: Positive impact on motivating the e-learning engagement of female with friends' support is greater than of its male parameter (H02: $\mu_f - \mu_m > 0$)

where μ is the mean value of the satisfaction score of the relevant gender.

Normal distribution Vs test statistic
Alternative hypothesis: greater



Welch Two Sample t-test

```
data: tps and tps2
t = 2.6471, df = 156.36, p-value = 0.004475
alternative hypothesis: true difference in means is greater than 0
95 percent confidence interval:
 0.1616759      Inf
sample estimates:
mean of x mean of y
 4.015385  3.584158
```

P-value < $\alpha = 0.05$; P-value = 0.0045
Therefore, Reject H0

Conclusion based on result:

We do not have enough evidence to say that positive impact on motivating the e-learning engagement of females with friends' support has no difference from its male parameter.

IV. DISCUSSION

The collected data implies that the majority of respondents are males, living in semi-urban area and home-based and have never attended a lecture on campus. They are from the University of Colombo which is slightly a biased analysis. They have a moderate satisfaction on the effectiveness of the e-learning experience but almost all of them agreed that friends and family support impact their e-learning performance.

In this study we have proven that there is a positive impact on motivating the e-learning engagement of females with family support is greater than of its male parameter. But we were unable to find evidence about the impact of friends' support based on gender.

Further improvements on this study requires more data representing the different universities (both private and state) and academic streams. It is also worth noting that since it was **observed that there were some disparities based on gender**, it is important that the sample represents the gender ratio of the undergraduate student population of Sri Lanka.

V. CONCLUSION

Even Though, we do not have enough evidence (rejected both null hypothesis) , there is a possibility that the females are more encouraged to engage in e-learning activities when they have family and friends support. The future studies are opened to further analysis with unbiased and large datasets.

Acknowledgment

Sincere gratitude goes to everyone who participated in the survey allocating their time for making this study a success. Dr. Uthayasanker Thayasivam deserves special recognition for sharing topic knowledge with students and establishing practical settings for pupils to implement theoretical techniques taught in class.

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