UNIVERSITI TEKNOLOGI MALAYSIA

Project 2 - SECI 2143

ANALYZING STUDENT'S PRE-COVID AND POST-COVID DAILY ACTIVITY AND ITS EFFECT ON THEIR ACADEMIC PERFORMANCE

SHAHRIL BIN SAIFUL BAHRI - A20EC0144
Project Manager

AMIR ISKANDAR BIN NORKHAIRULAZADDIN - A20EC0011
Data Analyst

IMAN EHSAN BIN HASSAN - A20EC0048
Survey and Research

FAAIQ FAJARI FAUZAN - A17CS0250
Data Analyst

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Dr. Sharin Hazlin Huspi

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Introduction

The COVID-19 pandemic which occurs in early 2020 has made whole new changes to the world and it also heavily impacts all aspects of activities especially education. After MCO was announced by the government in March 2020, all of the education institutions including UTM have been closed to prevent the spread of the virus. All of its students have been informed to leave the campus site and go back to their respective homes. As the situation has changed, the students need to adapt with the new situation and need to continue their study by using the online platforms. As this new situation emerges, many students need to cope with it and it also affects their academic performance.

Our team has decided to do a study about this situation and the purpose of this study is to determine whether the student's activity during COVID-19 can affect the student's academic performance or not. Do the students' academic performance before and after the pandemic is different? Does every faculty manage to do online learning effectively? How do the student activity hours affect their performance? In this report, all of those questions will be answered which results in our conclusion regarding this matter.

Methodology

The dataset used in this research is primary data that is obtained from an online survey that we conducted using Google Forms which we had distributed around the Universiti Teknologi Malaysia (UTM) students through different kinds of social media platforms. The targeted population is UTM students that study during the pandemic. Inferential statistics are carried out by using hypothesis testing two samples, correlation, regression and ANOVA.

Dataset

Introduction

In this project, we conducted an online survey using Google Forms which we had distributed around the Universiti Teknologi Malaysia (UTM) students through different kinds of social media platforms. Through this online survey we are able to get the data on how students adapt during this pandemic. The questions asked were about their study hours, data spending, cost for learning, daily activity and how their mental health is during this pandemic.

Sample Selection

The sample that we've got is from the students from Year 2, Year 3 and Year 4 since they had their past CGPA. Around 202 students from different kinds of faculty had filled the survey so that we can conduct this project successfully. At the end of the online survey we had asked for the reason and solution to help students manage their mental health during these trying times.

Limitation of the study

This study also contains some errors because the questions may have confused some of the students causing some error in the data.

No	Questions	Answers	Level of Measurement	Suggestion Input Type
General Question				
1	Gender	Male / Female	Nominal	Multiple choice selection
2	Age	Metric value	Ratio	
3	Year	Metric value	Ratio	Multiple choice selection
4	Faculty	Engineering, Social Science, etc...	Nominal	Multiple choice selection
5	Program	SECBH, etc...	Nominal	User Input
6	State (Malaysia, International)	Johor, Selangor, etc...	Nominal	User Input
7	Pre-Covid CGPA	Metric value	Ratio	User input
8	Post-Covid CGPA 1	Metric value	Ratio	User input
9	Post-Covid CGPA 2	Metric value	Ratio	User input
10	Preference (Study Method, Internet Provider)	Google Meet, Skype...	Nominal	Multiple choice selection
Pre Covid				
1	Hours student spend for studying	Metric value	Ratio	User input
2	Internet connection	Metric value	Ratio	User input

	speed			
3	Data spend on online study per month	Metric value	Ratio	User input
4	Cost spend for study per month	Metric value	Ratio	User input
5	Hours spend for housework/social media/ personal per day	Metric value	Ratio	User input
6	How is your mental health during this pandemic	Very bad, Bad, Neutral, Good, Very Good	Ordinal	Multiple choice selection
7	Reason for your mental health deteriorating	Study Environment, Technical Problem (PC,Laptop, etc..), Teaching method	Nominal	Paragraph
8	The best solution to help improve your academic	Improve internet connection, new teaching methods, etc..	Nominal	Paragraph
9	How frequent studying with friends	A month, a week ,less than a week etc	Ordinal	Multiple choice selection
Post Covid				
1	Hours student spend for studying	Metric value	Ratio	User input
2	Internet connection speed	Metric value	Ratio	User input
3	Data spend on online study per month	Metric value	Ratio	User input
4	Cost spend for study per month	Metric value	Ratio	User input
5	Hours spend for housework/social media/ personal per day	Metric value	Ratio	User input
6	How is your mental health during this pandemic	Very bad, Bad, Neutral, Good, Very Good	Ordinal	Multiple choice selection
7	Reason for your mental health deteriorating	Study Environment, Technical Problem (PC,Laptop, etc..), Teaching method	Nominal	Paragraph
8	The best solution to help improve your academic	Improve internet connection, new teaching methods, etc..	Nominal	Paragraph
9	How frequent studying with friends	A month, a week ,less than a week etc	Ordinal	Multiple Choice Question

Table 1: Data Table Collection Conduct

Data Analysis

Hypothesis

In this project, we conducted an online survey using Google Forms which we had distributed around the Universiti Teknologi Malaysia (UTM) students through different kinds of social media platforms. We assumed that Utm students can perform academically better during covid-19 with a mean of 3.0 and above in CGPA.

In this hypothesis, we want to see and compare whether there is any difference between the CGPA before covid and after covid under the t test 5% significance level.
Null Hypothesis H0= μ=3.0
Alternatives Hypothesis H1= μ>3.0
For this hypothesis testing, we are using the right tailed test. We assume both variance of both mean is not equal because there is no chance that both mean could be the same. We reject the null hypothesis if μ=3.0. The standard deviation for after covid-19 is 0.3612519 and the mean is 3.526931. When we calculate the z score , we get 20.728 and the z-score for Z.05 = 1.645. Since the Z-score for the data which is 20.728 is greater than the Z0.05 which is 1.645, we reject H0.

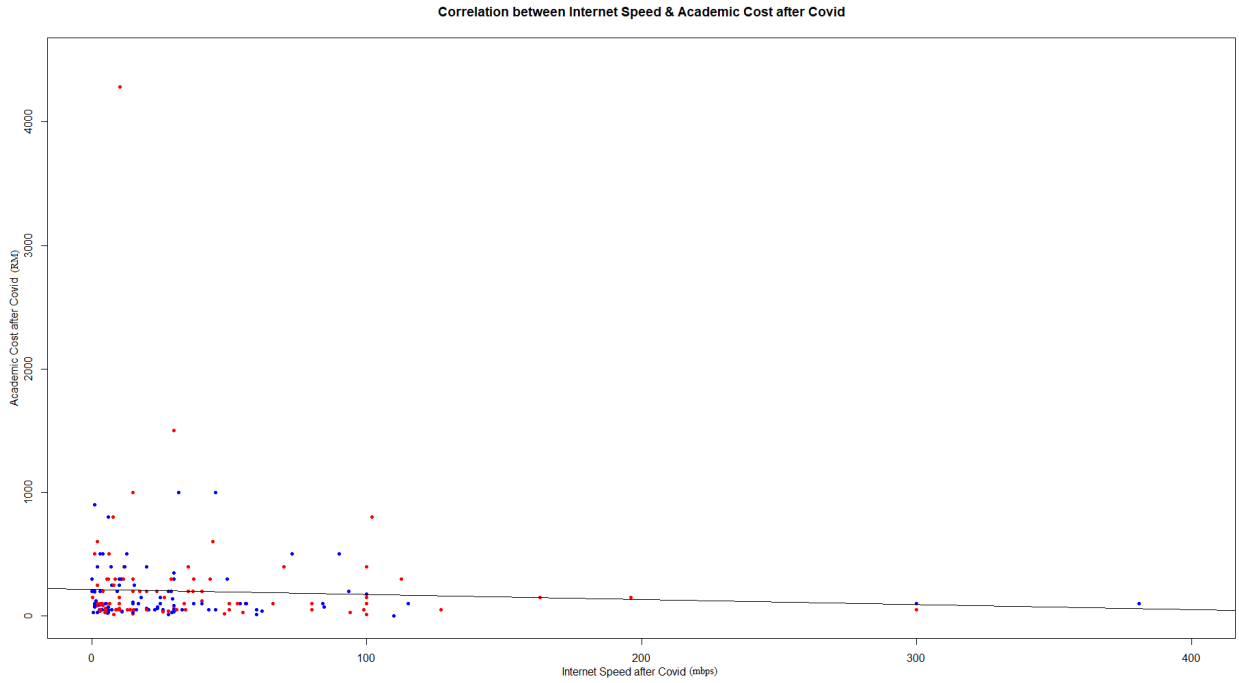
Hypothesis (Before & After Covid)(CGPA)
H0= The difference between mean difference before and after covid = 0
H1= The difference between mean difference before and after covid ≠ 0

For this hypothesis testing, we are using a two-tailed test.The standard deviation for this test is 0.2562. For the t test, we get -1.02 while for t-alpha ,we get 1.645 from the t-table.Since -1.02 is inside the bell diagram, it is failed to reject .

Correlation

For this test, a random sample of 203 students of UTM were selected to check if there is a linear relationship between cost of academic study and the internet speed of students in a month at the 5% level of significance. Variables used in this test are cost of academic study (ACAC) and internet speed (ISAC)

H0: There is no linear correlation between the cost of academic study and internet speed per month
H1: There is exist linear correlation between the cost of academic study and internet speed per month.



It can be seen from the graph above, the cost of academic study doesn't affect the internet speed of students after covid. It is because some of the students spend more on academic study but have less internet speed, also where students spend less on academic study but have more internet speed. The scatter plot is dense on internet speed is between 0 and 100 whereas on cost of academic study is between 0 and 1000. The scatter plot and correlation analysis of the data indicates that there is a negative relationship between Internet speed and Academic Cost after Covid.
R value is -0.06322875 which indicates that there is a weak negative relationship between variables tested.

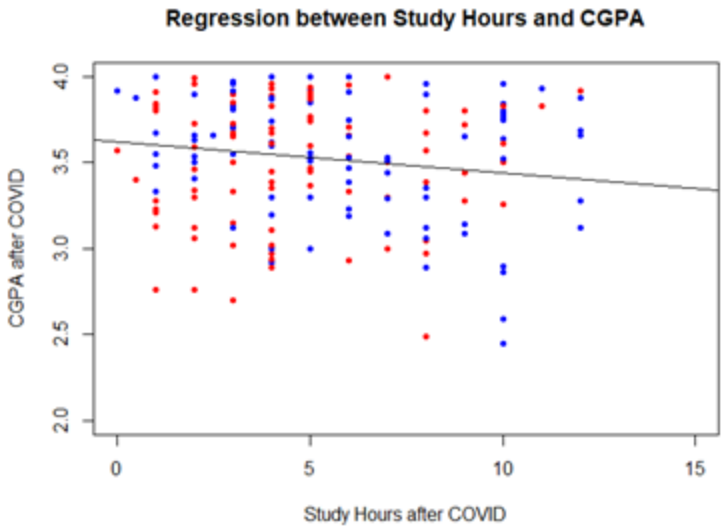
By looking at the result above we could say that we fail to reject the null hypothesis since t= -0.89922 > t(0.05/2,201) = -1.960 . Therefore, it is sufficient evidence that there is no linear correlation between the cost of academic study and internet speed at 5% level of significance.

Regression

For this test, the random sample of student's CGPA and hours that they spend studying have been selected and we want to see if hours that they spend studying can predict their CGPA at the 0.05 level of significance. The dependent variable (y) for this test is the student's CGPA and the independent variable (x) is the hours spent to study. The objective for this test is to ensure the existence of a linear relationship between the dependent variable (y) and the independent variable (y).

Null Hypothesis, H0: $\beta 1 = 0$ (no linear relationship)

Alternative Hypothesis, H1: $\beta 1 \neq 0$ (linear relationship does exist)



From the graph obtained, we can see that there is a negative linear relationship between student's CGPA and hours that they spend studying with least square regression equation of (y= 3.62443 – 0.01818x). The value of intersection coefficient, β0 is the estimated value of Y when the value of X is zero which is 3.62443. This indicates that the value observed is the proportion of a student's CGPA when the student does not spend any hour studying. The value of slope coefficient, β1 measures the estimated change in the average value of Y when there is a change in X. We obtained β1 = -0.01818 which indicates the average value of a student's CGPA decreases by 0.01818 when the hour spent studying increases by 1. Therefore, we can conclude that there is a negative linear relationship between the student's CGPA and hours spent to study based on the result obtained.

Anova

For this test, a random sample of 202 students of UTM were selected randomly for analyzing the relationship between CGPA mean after covid in session 19/20 semester 2 and all of the faculty. And checked if there is any difference in the mean from each faculty that affects due the pandemic covid. Variables that are used here are Faculty and CGPA after covid 2.

H0: $\mu 1 = \mu 2 = \mu 3 = \mu 4 = \mu 5 = \mu 6$ (for each faculty in University)

H1: $\mu i \neq \mu j$ for at least one faculty

And here is the result

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            Df Sum Sq Mean Sq F value Pr(>F)
Faculty      6  1.016  0.1694    1.44  0.203
Residuals  151 17.759  0.1176
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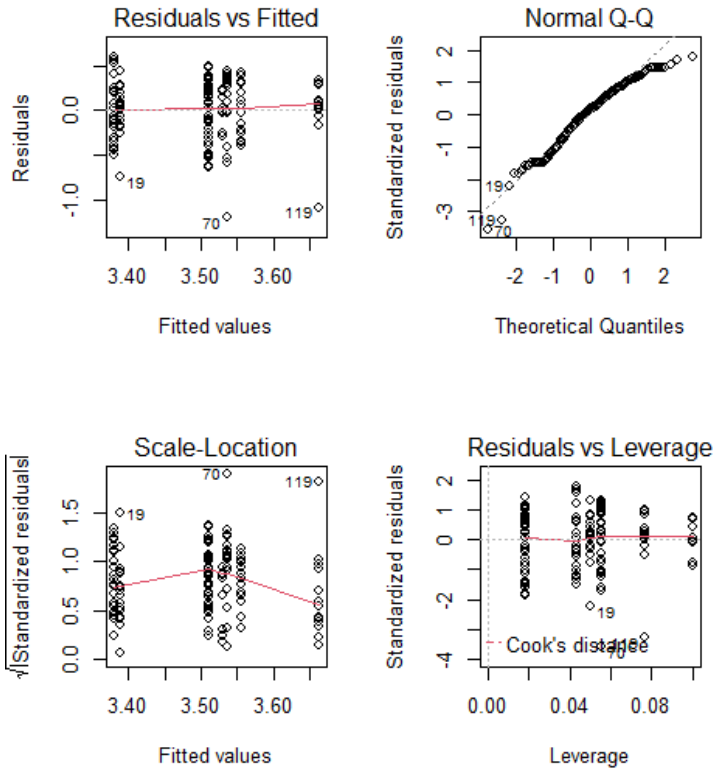

diff	Diff	Lwr	Upr	P
Faculty of Built Environment and Surveying-Azman Hashim International Business School	-0.27431	-0.63943	0.090816	0.278058
Faculty of Science-Azman Hashim International Business School	-0.1262	-0.49923	0.246833	0.950819
School of Chemical and Energy Engineering-Azman Hashim International Business School	-0.15213	-0.46765	0.163392	0.778676
School of Computing-Azman Hashim International Business School	-0.10731	-0.48034	0.265721	0.977825
School of Mechanical Engineering-Azman Hashim International Business School	-0.28231	-0.63793	0.073312	0.217669
School of Professional & Continuing Education (SPACE)-Azman Hashim International Business School	-0.13231	-0.56339	0.298777	0.969322
Faculty of Science-Faculty of Built Environment and Surveying	0.148111	-0.18486	0.481085	0.837159
School of Chemical and Energy Engineering-Faculty of Built Environment and Surveying	0.122179	-0.14479	0.389152	0.818047
School of Computing-Faculty of Built Environment and Surveying	0.167	-0.16597	0.499974	0.745144
School of Mechanical Engineering-Faculty of Built Environment and Surveying	-0.008	-0.32135	0.305347	1
School of Professional & Continuing Education (SPACE)-Faculty of Built Environment and Surveying	0.142	-0.25493	0.538931	0.936138
School of Chemical and Energy Engineering-Faculty of Science	-0.02593	-0.30362	0.251754	0.99996
School of Computing-Faculty of Science	0.018889	-0.32274	0.360513	0.999998
School of Mechanical Engineering-Faculty of Science	-0.15611	-0.47863	0.166413	0.775514
School of Professional & Continuing Education (SPACE)-Faculty of Science	-0.00611	-0.41033	0.398104	1
School of Computing-School of Chemical and Energy Engineering	0.044821	-0.23287	0.322508	0.999042
School of Mechanical Engineering-School of Chemical and Energy Engineering	-0.13018	-0.384	0.123641	0.72469
School of Professional & Continuing Education (SPACE)-School of Chemical and Energy Engineering	0.019821	-0.33202	0.371664	0.999998
School of Mechanical Engineering-School of Computing	-0.175	-0.49752	0.147524	0.668676
School of Professional & Continuing Education (SPACE)-School of Computing	-0.025	-0.42922	0.379215	0.999997
School of Professional & Continuing Education (SPACE)-School of Mechanical Engineering	0.15	-0.23821	0.538207	0.909646

It is found in average CGPA for faculty ($f=0.203$, $p<0.05$) with a significant 5%. A Tukey post-hoc test revealed that all the results and differentiation from each faculty and school, and most of them are almost 1 as considered the same. It also implement in lower and upper value that has no significant difference each between the faculty and school

From the graph also we can see that the residuals are also statistically significant. There is no random correlation between CGPA and Faculty. The line remains flat as well the CGPA is followed by the bubble. It also supports the graph for normal QQ, scale location and residuals vs leverage, all of them following the same pattern and shows no rank difference for CGPA that relate to the faculty.

For the column display data result such as degree of freedom independent variable is 6 as represent the faculty in UTM. also the total variation between the group means and overall means is 1.016. Also for mean of sum of squares, calculated by dividing the sum of squares by the degrees of freedom for each parameter is 0.16 and following the mean square of each independent variable divided by the mean square of the residuals is 1.44. Also the p value of f statistic is 0.203

As a result we can conclude that there is no significant difference between CGPA and Faculty, and impact of lower CGPA to the faculty during the pandemic and we can see the fact that all students from all faculty can still maintain their study online or offline.

Conclusion

In conclusion, we found out there are a lot of factors that affect the CGPA of 203 students of UTM.The factors such as social media , the hours of study and internet speed. For example, we can conclude that the cost of academic study doesn't affect the internet speed of students. We found out that the CGPA of the students basically came from the student itself. If there is a will, there is a way. The data that we collected and analyzed does not support strong enough evidence that we calculated.

We noticed that after we have done our project, we have learned a lot of new things in order to study data and analysis such as using r programming to ease the process to calculate mean , standard deviation etc of a big set of data. We found it a lot easier to use. After analyzing the data that we are using, we became more observant of our surroundings and curious . We noticed that we can study every single thing that we want to study such as the population of people in a town.Thus, it's open wider our point of view of nature.

Appendix

Term for Data

Short Term	Long Term
ACBC	Academic cost - before covid
ACAC	Academic Cost - after covid
HSBC	hour study - before covid
HSAC	Hour Study - after covid
DQBC	Data quota - before covid
DQAC	Data quota - after covid
ISBC	Internet Speed - before covid
ISAC	Internet Speed - after covid
HHBC	Hour Housework - before covid
HPBC	Hour Personal - before covid
HHAC	Hour Housework - after covid
HPAC	Hour Personal - after covid
CGBC0	CGPA - before covid 0
CGAC1	CGPA - after covid 1
CGAC2	CGPA - after covid 2
SOBC	Study Often - before covid
SOAC	Study Often - after covid
MHBC	Mental Health - before covid
CMBC	Causing Mental Health - before covid
SMBC	Support Reason Mental Health - before covid
MHAC	Mental Health - after covid
CMAC	Causing Mental Health - after covid
SMAC	Support Reason Mental Health - after covid

IPSC	Internet Provider - suggestion covid
SASC	Solution need academic performance - suggestion covid
TMSC	Teaching Method - suggestion covid
OPSC	Online Platform - suggestion covid
AESC	Anything Else - suggestion covid

Survey

link: bit.ly/slampp

Data

link: bit.ly/dataslampp

Programming

link: bit.ly/overhaul-rpsda

Video

link: bit.ly/overhaul-rpsda