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FACTORS AFFECTING POST GRADUATE ADAPTIVE PERFORMANCE IN ONLINE LEARNING DURING COVID-19 PANDEMIC

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ABSTRACT

The COVID-19 pandemic has caused various sectors in Malaysia to be closed, including the education sector. Thus, the effects of this COVID-19 pandemic have caused major concern among postgraduate students. Therefore, the learning system has been changed by using online learning so that students' learning activities are not interrupted. However, this online learning system has received poor feedback from students. This is because postgraduate students find that online teaching is tedious and uninteresting because online learning has so much time and flexibility that students never get the time to do it. Therefore, this study aimed to identify factors influencing postgraduate adaptive performance in online learning during the covid-19 pandemic. An online survey via Microsoft Form will be conducted and attended by a total of 82 postgraduate students from different backgrounds. Several statistical methods such as Pearson Correlation Coefficient, Cronbach Alpha Coefficient, t-test and One-Way ANOVA will be used to measure the dimensions. For this study, the researcher also used the conceptual framework method and referred to the Adaptive Performance to find the relationship between the factors influencing postgraduate adaptive performance in online learning during the COVID-19 pandemic. This study shows that strategies and actions are desperately needed between the ministry of higher education and universities especially UniKL MITEC to ensure academic survival among postgraduate students during the pandemic.

Keywords: *Online learning; COVID-19; Affecting; Adaptive performance; Postgraduate students*

1.0   Introduction

In Malaysia, the COVID-19 outbreak became increasingly widespread to other Asian countries when neighbouring Singapore reported the first COVID-19 case imported from Wuhan, China,

on January 23, 2020, which was the first positive case in the republic. From this first case, eight close acquaintances can be identified to be in Johor, Malaysia [1]. After that, the first death was confirmed on March 17, 2020. This was just a day before the country was placed under a strict order prohibiting movement (MRO). Furthermore, the number of cases has continued to increase since then and two general events have been linked to large surges in confirmed cases [2]. Since the cases of this COVID-19 outbreak have soared by mid-March 2020, most countries have responded by imposing travel restrictions, quarantine, home stay orders, and more.

Next, the Movement Control Order (MCO) was enforced to eradicate the spread of the Covid-19 epidemic. As a result, all the activities carried out have been closed for a while. Thus, the impact of COVID-19 has had a huge impact on the global economic sector. However, not only the global economy but also the education system of student learning is also disrupted. With the movement control order implement by the government, students are not able to attend classes in a face-to-face format with each other or learn formally. In addition, the situation has forced into learning institutions in Malaysia to stop some activities that have been planned in the academic calendar.

According to [3], the COVID-19 outbreak will affect students in a variety of aspects, including financial, academic, time management, and health. As such, every faculty in Malaysia has made changes in its delivery methods rapidly from traditional teaching methods to e-learning or online learning. According to [4], students feel a lack of community, technical problems, and difficulties in understanding teaching goals are major barriers to online learning. In an online learning environment, students were found to be unprepared to manage their employment, family, and social lives with their studies [5]. Furthermore, the students find online teaching to be boring and uninteresting since it requires so much time and flexibility that they never have the time to complete it [6].

Thus, this study aimed to identify the factors influencing the performance of postgraduate adaptation in online learning during the COVID-19 pandemic at UniKL MITEC. The findings of this study are expected to analyze the COVID-19 factor on the learning of postgraduate students at UniKL MITEC. There is a detailed analysis performed to understand student change through learning behaviours, both before and during Command Control (MCO).

2.0   Research Methodology

2.1   Population

In this study, the selected population is postgraduate students at UniKL MITEC located in Masai, Johor. Researchers will focus on postgraduate students majoring in coursework which are Master in Quality Engineering and Management (MQEM) and Master in Supply Chain Management (MSCM). Each population data taken will follow the month of student admission to UniKL MITEC, which is from January 2020 to January 2022. Respondents will guide the researcher and show the real situation and explain the detailed information.

2.2   Sampling

A selection of samples will be taken and representative of the population. By to Krejci and Morgan sampling table found in Appendix A, the total sample of postgraduate students in the

field of coursework for this study was 70 students. This is because the number of postgraduate students who take the course work field is 82 students.

2.3 Research Instrument

In this study, the research instrument that will be used for this study is a set of questionnaires. The questionnaire will be available in two languages such as English and Malay as the postgraduate students come from various races and nationalities to make the questions clear and understood by the respondents. The questionnaire will have two sections as described below.

2.3.1 Section A: Sociodemographic and Technology

Section A consists of sociodemographic and technology questions for postgraduate students. Sociodemographic and technology is a population characteristic and its characteristics such as nationality, gender, age (years old), campuses and institutes, level of study, department, mode of study, year of study, source of financial to current study, main gadget for study, online learning platform and communication platform.

2.3.2 Section B: Factors affecting postgraduate in online learning during COVID-19.

Section B consists of questions from the factors affecting postgraduate in online learning during COVID-19. The Likert scale is used to measure the items in this section. Higher scores indicate higher expectations and higher perceptions. In this questionnaire, the researcher will focus on three main challenges for this study. Among the four factors are academic activities, social relationships, reasons for pursuing postgraduate studies and students' adaptive performance.

2.4 Data Analysis

All statistical analyses that will be carried out for this study are summarized in Table 2.1.

Table 2.1 Summary of Data Analysis

Analysis	Method	Purpose
Normality	Graphical and statistical normality test	To ensure sample is normally distributed.
Descriptive	Mean comparison	Identify central tendency of response.
Reliability	Cronbach Alpha coefficient	To ensure internal consistency.
Relationship	Pearson Correlation Coefficient	To identify the relationship between factors affecting postgraduate adaptive performance in online learning during COVID-19 (IV) and student adaptive performance (DV).
Differences	t-test	To identify different perceptions between gender.
Differences	t-test	To identify different perceptions between department.
Differences	One-way ANOVA	To determine perceptions of respondents from different gadget.

2.5   Conceptual Framework

This study proposes a research hypothesis based on the scope of the literature review between the definition of the variable and the theoretical framework that has been discussed in the previous chapter. The relationship between the independent variable (Academic Performance. IV1), (Social Relationship, IV2), (Reasons for pursuing postgraduate studies, IV3) and the dependent variable (students' adaptive performance, DV). In the dependent variables, the researcher will focus on Students Adaptive Performance which is handling work stress, dealing with uncertainties and unpredictable work situation, and learning work task and technologies and procedures.
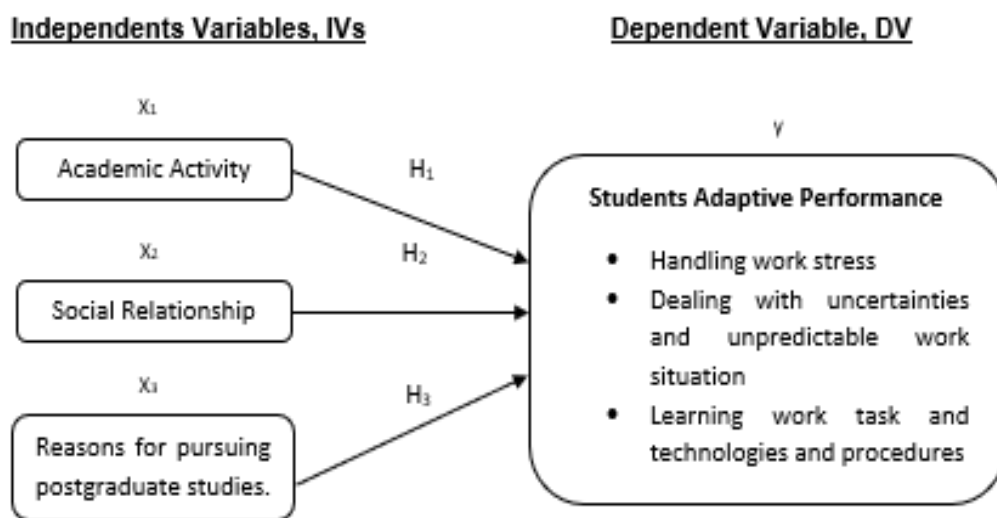

Figure 2.1 Schematic diagram of relationship between factors affecting postgraduate in online learning during COVID-19 (IV) and student's adaptive performance (DV).

2.6   Independent Variables (IV)

a. **IV$_1$**
- **Academic activities** are student-focused extracurricular clubs and programs offered at a college or university. Student activities are generally designed to allow students to become more involved on campus. Often, such activities provide the students with opportunities to develop leadership, social responsibility, citizenship, volunteerism, and employment experience [7].

b. **IV$_2$**
- **Social relationships** refer to relationships that develop between people who are in regular contact and are considered to have personal interests by a person [8].

c. **IV$_3$**
- **The reason for pursuing postgraduate studies** is because a university education exposes students to an infinite number of experiences, situations, demands, and problems, all of which are likely to affect and impact students' thinking about their future careers and worldview. Universities can directly impact graduate intentions, in addition to the experiences inherent in a university career that might change and influence postgraduate intents [9].

2.7 Hypotheses Development

A selection of samples will be taken and representative of the population. By to Krejci and Morgan sampling table, the total sample of postgraduate students in the field of coursework for this study was 70 students. This is because the number of postgraduate students who take the course work field is 82 students.

- **H^1**: There is a significant relationship between academic activities and students' adaptive performance during pandemic COVID-19.

- **H^2:** There is a significant relationship between social relationships and students' adaptive performance during pandemic COVID-19.

- **H^3**: There is a significant relationship between the reason for pursuing postgraduate studies and students' adaptive performance during pandemic COVID-19.

- **H^4:** Educators of different "genders" and "department" of students will differ significantly on the challenges in online learning that influenced their adaptive performance during the COVID-19 pandemic.

- **H^5:** Educators of different "genders" and "department" of students will differ significantly on the challenges in online learning that influenced their adaptive performance during the COVID-19 pandemic.

- **H^6:** Educators of different "main gadget for study" of students will differ significantly on the challenges in online learning that influenced their adaptive performance during the COVID-19 pandemic.

2.8 Dependent Variables (DV)

In this section, the researcher has referred to "Adaptive Performance" developed by [10]. Among them are:

a. **DV$_1$**
- **Handling Work Stress:** I can manage the stress caused by the change in learning method due to the pandemic.

b. **DV$_2$**
- **Dealing with Uncertain and Unpredictable Work Situations:** I am capable to deal and manage the uncertainty and unpredictable learning situations caused by the pandemic.

c. **DV$_3$**
- **Technologies and Procedures:** I can easily adapt to the new method of learning, technologies, and procedures when the online learning started.

3.0 Result and Discussion

3.1 Information Analysis

The questionnaire was successfully distributed to 82 Unikl MITEC postgraduate students from two different departments which are "Master in Quality Engineering and Management" (39 students) and "Master in Supply Chain Management (MSCM)" (43 students). Therefore, a total of 64 students have successfully answered this questionnaire.

3.1.1 Respondents Analysis (Demographic Statistic)

Table 3.1 Summary of Demographic Analysis 64 students

Measure	Items	Frequency	Percent	Cumulative
Nationality	Malaysian	64	100	100
Gender	Male	26	40.6	40.6
	Female	38	59.4	100
Age	<25 years	14	21.9	21.9
	26-30 years	31	48.4	70.3
	31-35 years	12	18.8	89.1
	36-40 years	5	7.8	96.9
	41-45 years	1	1.6	98.4
	46-50 years	1	1.6	100
Campuses and Institutes	UniKL MITEC	64	100	100
Level of Study	Master's Degree	64	100	100
Sections/ Departments	Master in Quality Engineering and Management (MQEM)	32	50	50
	Master in Supply Chain Management (MSCM)	32	50	100
Mode of Study	Full time	61	95.3	95.3
	Part time	3	4.7	100
Year of Study	1	23	35.9	35.9
	2	34	53.1	89.1
	3	5	7.8	96.9
	4	2	3.1	100
Source of financial to current study	Part-time job	1	1.6	1.6
	Full time job	16	25	26.6
	Scholarship	7	10.9	37.5
	Study Loan	37	57.8	95.3
	Family/Spouse	3	4.7	100
Main gadget for study	Smartphone	6	9.4	9.4
	PC / laptop	55	85.9	95.3
	iPad or Tablet	3	4.7	100
Online learning platform	Microsoft Teams	64	100	100
Communication Platform	WhatsApp Group	64	100	100

3.2 Preliminary Analysis

To begin the process of inspecting data file and exploring the nature of variables, the data file should be cleaned. In preliminary analysis, it covers checking the distribution of score on

continuous variables in terms of normality and possible outliers. It also used to check the reliability (internal consistency) of a scale is presented.

3.2.1   Normality Test

Table 3.2 Normality assessment of variables (N = 64)

Variables	Skewness	Kurtosis	Conclusion
Academic Activities	-.341	.676	Normal distribution
Social Relationship	-1.072	2.606	Non-normal Distribution
Reasons for pursuing postgraduate studies.	-1.08	4.165	Non-normal Distribution
Students Adaptive Performance	-1.096	1.464	Non-normal Distribution

The number of cases accepted for this study changed from 64 to 63. The normality of the score distribution was resumed after outlier removal. After the normality of the score distribution was re -run, it was found that each variable had changed to a normal distribution. So, parametric testing will be performed in this research study for further data analysis. Table 3.3 discusses the evaluation and results.

Table 3.3 Normality assessment of variables (N = 63)

Variables	Skewness	Kurtosis	Conclusion
Academic Activities	-.072	-.322	Normal distribution
Social Relationship	-.310	-.495	Normal distribution
Reasons for pursuing postgraduate studies.	.171	-.866	Normal distribution
Students Adaptive Performance	-.856	.751	Normal distribution

3.2.2   Reliability Test

Table 3.4 Reliability Statistic

Reliability Statistic	Cronbach's Alpha	N of items	Results
By Items	.880	20	Good
By Category	.712	4	Acceptable

The consistency test values for Cronbach's Alpha by item were higher than by category i.e., .880 for items and .712 for categories as shown in Table 3.4. Thus, based on the rule of thumb Cronbach's Alpha value is good and suitable for use in this study.

3.3   Analysis for Research Question 1

First research question asked; What are the factors that affect the learning performance of postgraduate students in online learning during COVID-19 pandemic?

3.3.1   Mean Score Analysis

A summary of the mean scores for each variable is shown in Table 3.5. The results showed that all variables had a mean score above 3.00. These results indicate that each variable is considered important to the respondents when involving UniKL MITEC postgraduate students in facing learning sessions during the COVID-19 pandemic.

Table 3.5 Mean Score analysis of variables (N=20)

Items	Questionnaire Items	Means	Standard Deviation
IV$_2$	Social Relationship	4.3016	.54225
IV$_3$	Reason For Pursuing Postgraduate Studies	4.0476	.58347
IV$_1$	Academic Activities	3.5853	.66631
DV	Students Adaptive Performance	3.6614	.72954

3.4 Analysis for Research Question 2

Second research question asked; Which factors (Academic Activities, Social Relationship, and Reasons for pursuing postgraduate studies) contributed the most to the impact of student learning sessions during the COVID-19 pandemic?

3.4.1 Pearson Correlation Coefficient (PCC) Analysis

Table 3.6 Pearson Correlation Coefficients (PCC) Analysis

	Academic Activities	Social Relationship	Reasons for pursuing postgraduate studies.
Pearson Correlation	.420	.205	.231
Sig. (2-tailed)	<.001	.107	.068
N	63	63	63
Result	Medium	Low	Low

In this analysis, there is one variable that has a medium correlation that is Academic Activities (r = 0.420). However, there are two variables that have a low but positive correlation, which is Social Relationship (r = 0.205) and reasons for pursuing postgraduate studies (r = 0.231).

3.4.2 Multiple Regression

Regression analysis is a statistical forecasting model that is used to describe and evaluate the relationship between dependent and independent variables. Using multiple regressions, theories or models can test about precisely which set of variables is influencing the behaviour of study.

Table 3.7 Model Summary[b]

Model	R	R Square	Adjust R Square	Std. Error of the Estimate	Result
1	.429[a]	.184	.142	.67566	Moderate Relationship

a. Predictors: (Constant), RPPS, ACADEMICACTIVITIES, SOCIALRELATIONSHIP
b. Dependent Variable: STUDENTSADAPTIVEPERFORMANCE

The multiple correlation coefficient (R) was to measure the strength of the relationship between Y (Student Adaptive Performance) and the five predictor variables X (Academic Activities, Social Relationship and Reasons for pursuing postgraduate studies) selected for inclusion in the equation. In this case, R = 0.429a or 42.18.4%% which tells us there is a strong relationship. Next, R Square (R2) is the square of this correlation measure and indicates the proportion of variance in the criterion variables considered by our model. So, in this analysis it is shown that

the independent variable (IV) only plays a role of 18.4% to Student Adaptive Performance (DV).

Table 3.8 ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.064	3	2.021	4.428	.007[b]
	Residual	26.934	59	.457		
	Total	32.998	62			

a. Dependent Variable: STUDENTSADAPTIVEPERFORMANCE
b. Predictors: (Constant), RPPS, ACADEMICACTIVITIES, SOCIALRELATIONSHIP

The F ratio in the ANOVA table was used to test whether R^2 could occur by chance alone or not. In short, the F-ratio measures the probability of the chance of departing from a straight line. The F ratio in the table labelled 'regression' represents the ratio of the improvement in the prediction resulting from the assembly of the model, compared to the inaccuracies that still exist in the model (labelled 'residual' in the table).

The multiple regression model with all four predictors yielded $R^2 = 0.184$, $F (3, 59) = 4.428$, $p <.007$. This table reports the ANOVA, which assesses the overall significance of our model. As $p <0.05$, the model was significant and improved the ability to predict outcome variables.

Table 3.9 Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	2.042	.747	-	2.734	.008
ACADEMICACTIVITIES	.476	.162	.434	2.940	.005
SOCIALRELATIONSHIP	-.121	.206	-.090	-.585	.561
RPPS	.107	.174	.086	.617	.540

a. Dependent Variable: STUDENTSADAPTIVEPERFORMANCE

Only one predictor (Academic Activities) was highlighted that contributed significantly to the model (Students Adaptive Performance) which had a p value of 0.05. However, the "Social Relationship (p -value = 0.561)" and "Reason for Pursuing Postgraduate Studies (p -value = 0.54)" models are not important predictors because the p value is more than 0.05. These results have informed that respondents are more focused on their learning sessions despite being hit by the COVID-19 epidemic crisis compared to other things. This is because students are still able to continue their online learning sessions, but students also lack observation in the aspects of Social Relationship and Reason for Pursuing Postgraduate Studies. Thus, Social Relationship and Reason for Pursuing Postgraduate Studies have low correlations while others are moderate.

Table 3.10 Significant Variables

	Beta	Sig.
Constant	2.042	.008
Academic Activities	.476	.005

* Social Relationship (b=-.121; p=.561 > .05) was not a significant predictor in this model.

* Reason for Pursuing Postgraduate Studies (b=-.107; p=.540 > .05) was not a significant predictor in this model.

Result of multiple regressions for this study also can be interpreted into an equation shown below:

$$DV = 2.042 + .476 \ IV1$$

3.5 Analysis for Research Question 3

Third research question asked; Is there any difference between "Gender" and "Department" postgraduate students with students' adaptive performance? This question was solved by using independent sample t-test as it involves comparison of mean score on two different groups of people.

3.5.1 Independent sample t-test for "Gender"

Table 3.11 Independent Sample Test for "Gender".

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Academic Activities	Equal variances assumed	6.275	.015	.441	61	.661 Not significant
	Equal variances not assumed			.410	39.323	.684 Not significant
Social Relationship	Equal variances assumed	.377	.541	-1.35	61	.182 Not significant
	Equal variances not assumed			-1.31	47.867	.197 No significant
Reason for Pursuing Postgraduate Studies	Equal variances assumed	1.160	.286	-.212	61	.832 Not significant
	Equal variances not assumed			-.206	47.935	.838 Not significant
Students Adaptive Performance	Equal variances assumed	.083	.774	1.222	61	.226 Not significant
	Equal variances not assumed			1.211	52.164	.231 Not significant

In this analysis shows that there is no significant difference in each variable for males and females because the p-value is above 0.05.

3.5.2 Independent sample t-test for "Department"

Table 3.12 Independent Sample Test for "Department".

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**
Academic Activities	Equal variances assumed	.663	.419	-2.027	61	.047 Significant
	Equal variances not assumed			-2.033	59.799	.047
Social Relationship	Equal variances assumed	1.644	.205	-2.546	61	.013 Significant
	Equal variances not assumed			-2.539	58.892	.014
Reason for Pursuing Postgraduate Studies	Equal variances assumed	5.045	.028	-2.608	61	.011
	Equal variances not assumed			-2.596	55.678	.012 Significant
Students Adaptive Performance	Equal variances assumed	.716	.401	-.514	61	.609 No significant
	Equal variances not assumed			-.512	57.476	.610

In this analysis shows that there has significant difference in each variable for MQEM and MSCM because the p-value is above 0.05. The p-values for Academic Activities (p = .047), Social Relationship (p =. 013) and Reason for Pursuing Postgraduate Studies (p =. 012) were below .05 as shown in Table 3.12.

3.6 Analysis for Research Question 4

Fourth research question asked; Is there any difference between main gadget for study with students' adaptive performance?

3.6.1 One-way ANOVA

A one-way between groups analysis of variance was conducted to explore the impact of main gadget for study on students' adaptive performance. Subject were divided into three groups according to their level of main gadget for study (Group 1: Smartphone; Group 2: PC / laptop; Group 3: iPad or Tablet). Alpha was set at 0.05 during the analysis.

Table 3.13 ANOVA

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**

Students Adaptive Performance	Between Groups	.313	2	.157	.287	.751
	Within Groups	32.685	60	.545		
	Total	32.998	62			

According to the result from ANOVA as shown in the Table 3.13, if the Sig. value is less than or equal to .05 (e.g., .03, .01, .001), then there is a significant difference somewhere among the mean scores on dependent variable for the three groups. In this case, it is found that there is no significant difference because the p value is more than .05. This is because of the value (Students Adaptive Performance, p = 0.751).

Table 3.14 Multiple Comparison (Turkey HSD)

Students Adaptive Performance	(I) Main Gadget	(I) Main Gadget	Mean Difference (I-J)	Sig.	Result
	Smartphone	PC/Laptop	-.24074	.730	Not Significant
		iPad or Tablet	-.22222	.905	Not Significant
	PC/ laptop	Smartphone	.24074	.730	Not Significant
		iPad or Tablet	.01852	.999	Not Significant
	iPad or Tablet	Smartphone	.22222	.905	Not Significant
		PC/Laptop	-.01852	.999	Not Significant

The result from post-hoc comparisons using the Tukey HSD test shown in Table 3.14 showed that each group (Smartphone, PC/Laptop and iPad or Tablet) had no significant difference because the p value had exceeded 0.05. Therefore, Hypothesis 6 (H6) was rejected because there was no significant between "students' adaptive performance" and "main gadget of study" was rejected because the significant value had exceeded 0.05.

3.7   Summary of Findings

The identification of (6) hypotheses has been stated in the previous chapter of chapter 3. The stated hypotheses have been used to summarize the findings of the analysis in this chapter. Based on Table 3.11 below, null hypothesis (Ho) for all hypotheses (H1-H6) briefly there is a significant relationship shown between factors influencing postgraduate online learning during COVID-19 (IV) and student adaptive performance (DV). All these hypotheses were evaluated by SPSS and a summary of the findings is presented in Table 3.15.

Table 3.15 Summary of Findings

Hypothesis	Result
H1: There is a significant relationship between academic activities and students' adaptive performance during pandemic COVID-19.	Accepted
H2: There is a significant relationship between social relationships and students' adaptive performance during pandemic COVID-19.	Accepted

H3: There is a significant relationship between the reason for pursuing postgraduate studies and students' adaptive performance during pandemic COVID-19.	Accepted
H4: Educators of students of different "gender" will differ significantly on the factors in online learning that influenced their adaptive performance during the COVID-19 pandemic.	Rejected
H5: Educators of students of different "departments" will differ significantly on the factors in online learning that influenced their adaptive performance during the COVID-19 pandemic.	Accepted for: ✓ Academic Activities ✓ Social Relationship ✓ Reason for pursuing postgraduate studies
H6: Educators of different "main gadget for study" of students will differ significantly on the challenges in online learning that influenced their adaptive performance during the COVID-19 pandemic.	Rejected

4.0   Conclusion and Recommendation

In summary, the process of reviewing this study using input from the variables has produced a reliable and valid questionnaire to measure the factors influencing postgraduate adaptive performance in online learning during the COVID-19 pandemic. This study also examines and fully understands the research elements in the development of research papers. Furthermore, the conceptual framework is very important in this study because the theoretical framework serves as the focus for the research, and it is linked to the research problem under study. What has been hypothesized in this study is that there is a significant relationship between the dependent variable and the independent variable. Therefore, the results of this study can be used with confidence to plan future actions and research. Hopefully this study can help improve the education system in Malaysia in weathering the COVID-19 pandemic situation and can help prospective postgraduate students to be better prepared and learn from the situation.

5.0   Acknowledgement

6.0   References

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