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THE IMPACT OF COVID-19 ON MATHEMATICS EDUCATION STUDENT'S RELATIONSHIPS BETWEEN PEERS, LECTURERS AND PARENTS DURING ONLINE LEARNING

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Abstract:

Global education systems have experienced an abrupt disruption in traditional classroom instruction due to the coronavirus pandemic, which compelled all schools to close in March 2020 and introduced home-based distance learning. Consequently, families, schools, and students have had to collaborate more closely. The shift to online learning can impact student relationships. Maintaining open communication with peers, seeking virtual interactions with lecturers, and involving parents in the learning process can foster a supportive environment. Thus, this study is to determine the impact of COVID-19 on student's relationships between peers, lecturers, and parents during online learning. Questionnaires were distributed to Education Mathematics' students. Total respondents are 82 students. Dependent variable is online learning and three independent variables are student's relationship with classmates, student's relationship with lecturers and student's relationship with family. Data was analysed by using SPSS statistical tool. ANOVA test used to determine significant factors towards values in mathematics and path analysis testing the established hypotheses. The result indicated all three factors shows a significant factor. It means that student's relationship with classmates/peers, lecturers/faculty, and family play an important role during online class. Recommendations include utilizing online platforms for group activities and addressing concerns promptly to ensure a positive learning experience.

Keywords:

Online Learning, Student Relationship, Classmates, Lecturer, Family

Introduction

The classroom has been essential for students to excel in their studies in the world education system. Students are used to being in the classroom from elementary school until university. The existence of classes can benefit students in education and social purposes. The most important ones are the social purposes that can only be gained through social contact in classes. When students can communicate with one another and participate actively, they learn more (Hurst, Wallace, and Nixon, 2013). It shows that social class interaction is significant for students' educational growth. The ability to have dialogues with other people during learning impacts the students. Classrooms have given comfortable and memorable places for students to learn.

Online education had a complicated and transformational effect during the COVID-19 outbreak. It has given students access to studying remotely, which has been a lifeline for educational continuity, but it has also exposed and widened gaps in educational resources and technological use (Assaiqeli et al., 2023). With students from underprivileged communities finding it difficult to fully participate in virtual classes, the digital divide has gotten wider. The move to online learning has put pressure on teachers to adapt quickly, which has given students a variety of learning opportunities and exposed the shortcomings of virtual platforms in terms of promoting productive teacher-student interaction. Concerns over students' mental health and wellbeing have increased, and student motivation has declined as a result of the absence of in-person participation. Moving forward, addressing these challenges, and fostering a more inclusive, equitable, and engaging online learning environment remains a crucial priority for the education sector (Quezada et al., 2020).

The existence of virtual and online learning has changed one of the essential elements in education: the students' relationships. It limits the interaction of students in their learning. Although technologies and the internet's make it feel that there is no distance between the students, classmates and lecturers, the limitation of how much they can do online will affect them slowly. However, online learning has closed the distance between them and their parents. Online education is on the rise amid the COVID-19 pandemic. All the people's movements have been restricted around the world. However, it does not stop the education system from moving into an online era. Students today grow up with the help of contemporary technology and the Internet (Nurhaiza, 2020). As the situation changes, students can see how much the changes in their relationships affect their online learning, whether good or bad.

The researcher will study how relationships between peers, lecturers, and parents affect online learning during the covid-19 pandemic. The general purpose of the research is to explore the impact of relationships between peers, lecturers, and parents on online education during the pandemic. The researcher has found that this topic is vital during the pandemic. The COVID-19 and Malaysia Movement Control Order (MCO) have posed substantial challenges to schools and higher education institutions in various circumstances (Nurhaiza, 2020). This situation has given the researcher a reason to research this topic in more depth as education has changed.

Research Question

Based on the research objectives, there are research questions that need to fulfil by participants. The research questions that arise in this study are:

- a) To what extent is there a relationship between the factors (student's relationship with classmates, student's relationship with lecturers and student's relationship with family) and online learning during COVID-19 pandemic?
- b) What is the most significant student's relationship factor that influences online learning during COVID-19 pandemic?

Research Objective

The research objectives are:

- a) To identify the relationship between student's relationship with classmates, student's relationship with lecturers and student's relationship with family and online learning during COVID-19 pandemic.
- b) To investigate which student's relationship factor that influence the most during online learning.

Literature Review

Online Learning

COVID-19 has brought a sudden shock to the whole world. It also has affected the education systems worldwide, including in Malaysia. It impacts every sector in Malaysia, including education. The hasty implementation of the MCO has brought the education system to online education. Social distancing, mask-wearing and many others have changed how the world approaches its education system.

Since the late 1990s, Malaysian Higher Learning Institutions have been implementing online learning (Selvanathan, Hussi, and Azazi, 2020). Online learning has been implemented for a way, long in Malaysia, even before many people could afford the technology. The capacity to reach worldwide audiences, unique functionality, accessibility, and long-term flexibility have increased the demand for online learning (Azhari and Ming, 2015).

We believe that the difference in involvement between traditional classroom-based and online courses leads to distinct learning outcomes (Li et al., 2014). Some people doubt the quality of learning compared to conventional education. During the early stages of e-learning development, there was a dearth of qualified teachers, infrastructure, and student readiness (Azhari and Ming, 2015). These factors have increased the doubts about online learning in Malaysia.

Students Relationships with Classmates

Students' relationships with their classmates have changed significantly during the COVID-19 pandemic, with a greater emphasis now being placed on digital communication rather than the more customary face-to-face contacts. Due to social distancing policies and the widespread use of remote learning, there is less opportunity for in-person interaction, which makes it more difficult to form new friendships and maintain current ones. Students' sense of loneliness has been exacerbated by the lack of informal interactions and group activities (Abel and McQueen, 2020). Nevertheless, creative methods for online academic collaboration, virtual socializing, and the function of encouraging online spaces have surfaced in the face of these difficulties. Students have demonstrated resilience and adaptation in managing the changed environment of peer contacts throughout the pandemic by utilizing digital platforms for group projects,

virtual events, and social media to retain and develop connections (Mohammed et al., 2020). Existing literature on student relationships during online learning emphasizes the importance of communication and collaboration. Studies suggest that maintaining strong peer connections is vital for academic success and mental well-being. Additionally, effective communication with lecturers is highlighted as a key factor for engagement.

The study by Lamere and Kennedy (2020) explores the impact of personal classroom friendships on online learning within the Mathematics Department. The research investigates how these friendships influence students' experiences and outcomes in the online learning environment. The findings contribute to understanding the role of social connections in the context of virtual education within the specific domain of mathematics. However, Borup et al., (2013) investigates the nature of adolescent learner interaction in a virtual high school setting. Focusing on virtual high school interactions, the study explores the patterns and characteristics of student engagement within this online learning environment. The authors employ a qualitative approach to analyse the interactions among adolescent learners, aiming to provide insights into the dynamics of virtual high school education. The findings shed light on the nature of student engagement, collaboration, and communication within the context of virtual high schools, contributing valuable information to the understanding of online learning interactions at the secondary education level.

There is a need to explore the effectiveness of virtual platforms in facilitating meaningful interactions, the role of online collaboration in academic settings, and the overall resilience and adaptability of students in maintaining a sense of connection within the altered landscape of peer relationships during the pandemic. In the current educational context, addressing these concerns is critical for educators, policy makers, and institutions to provide sufficient assistance and build a pleasant social environment for students.

Students Relationships with Lecturers

Students who study online are frequently geographically separated from the rest of the academic community. It adds to the instructor's workload to facilitate online classroom engagement (Sher, 2009). Some teachers are unfamiliar with technologies, making it hard for them to manage the classroom during online education. It will result in difficulties communicating with the students as the teachers or lecturers must address the technologies more.

The results of the past research (Mohammad Alawamleh, 2020), most students think that online learning has harmed communication between instructors and students and that connecting with their lecturers has also grown more complicated. It could be the feeling of isolation and being far away from their teachers, making them hard to communicate. According to research published in the International Review of Research in Open and Distance Learning, online learning can cause misconceptions between students and teachers, which can have a negative impact on the teaching-learning process and students' results owing to task misinterpretation (Indira Dhull, 2019). Even face-to-face communication will have a problem with misunderstanding, so the technologies with the availability of typos and misreading of text will make it hard for the students-teachers to communicate.

However, past research (Sher, 2009) shows that technology improves and increases student-to-student and instructor-to-student engagement. The distance which makes communicating face

to face impossible in online learning makes the students depend more on the technologies to communicate. Online environments tend to pique the interest of shy pupils more than traditional ones (Hung et al., 2010). Although some students have problems communicating and maintaining good relationships with their teachers in online education, shy students will lighten up more as they can connect comfortably with their teachers through the internet.

Exploring the adaptability of both students and lecturers to this new mode of engagement, assessing the effectiveness of virtual office hours, and understanding the role of technology in maintaining a positive and constructive academic relationship are crucial for enhancing the overall educational experience (Puma et al., 2022). In the rapidly changing world of remote learning, educational institutions must take these issues into consideration when formulating plans that promote deep and encouraging connections between students and lecturers.

Students' Relationships with Family

When parents and children work together on learning activities, their connection strengthens because they can spend more time together. In such situations, parents may become a source of comfort for their children by relieving their discomfort and stress and engaging in talks with them to help them cope with their fear (Bhamani et al., 2020). Online education has provided time for parents and students to spend with each other. The parents can take the role of a teacher at school during online education. The same research states parents must deal with homework more than ever, including explaining worksheets and other assignments to their children.

Parental communication is also vital for student achievement, and parents should model this for their children to communicate more effectively with their instructors (Belair, 2012). When they have difficulty learning, the students must refer to their parents as they spend more time than usual. Parents must play a bigger part in their children's day-to-day activities in an online context. According to the children, the organization is where parents appear to help the least (Keaton and Gilbert, 2020). In the same study, Simon states this about his mom "She'll write down everything I have due for the week and make sure I complete it regularly until I'm finished". The student and parent relationship can be nurtured more through online education as they are helping their children. Most of the kids stated that their parents encouraged them by discussing and planning for their future (Keaton and Gilbert, 2020). Parents' involvement will help their students study and maintain their relationships.

However, according to instructors, overly involved parents might hinder their children's learning (Borup J., 2016). Parental engagement varies according to the students themselves. Some students prefer to deal with most of the work alone, some depend entirely on their parents for something they do not understand, and some are in the middle of it. Parents may need to learn from their children's teachers how to help them manage their children's studies.

Through of virtual platforms, parents can take an active role in their child's education by learning about the curriculum, offering assistance with tasks, and participating in group learning activities. Online learning also makes schedules more flexible, allowing families to adjust to situations and find a balance between shared family activities and academic obligations (Sugden et al., 2021). Addressing these concerns is essential for educators, policymakers, and families to collaboratively navigate the evolving landscape of student-family relationships in the current educational scenario shaped by the COVID-19 pandemic (Murray et al., 2020).

Conceptual Framework

Figure 1 of the conceptual framework in this research study.

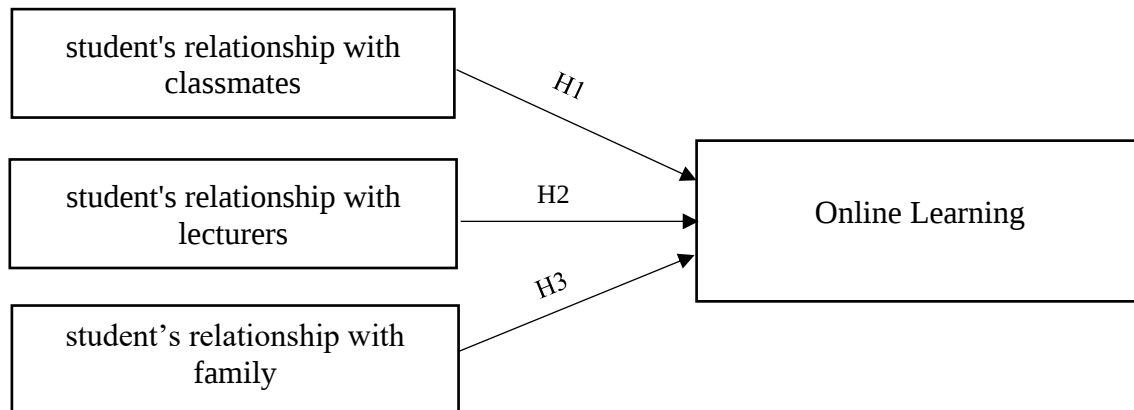


Figure 1: Conceptual Framework

The summary of the hypothesis statement as follows:

- H1: There is no significant relationship between student's relationship with classmates and online learning.
- H2: There is no significant relationship between student's relationship with lecturers and online learning.
- H3: There is no significant relationship between student's relationship with family and online learning.

Methodology

This study will adopt a quantitative research design, emphasising the collection and statistical analysis of numerical data. The aim of the study is to investigate the factors that affect the online learning among students. The study utilized descriptive, correlation and regression analyse to answer the research objectives and to test the research hypothesis by using Google Form for data collection. Data collection will be executed through structured survey questionnaires and analysed using the Statistical Package for Social Sciences (SPSS). In this study, the independent variables independent variables (student's relationship with classmates, student's relationship with lecturers and student's relationship with family) the last section consists of dependent variable (online learning). This study focuses on the faculty of education at Universiti Teknologi MARA, Selangor. Based on sample size formulas by Krejcie and Morgan (1970) devised a table that assists the researcher in determining the sample size (with 95% certainty). Therefore, the study sample involves 82 students from Bachelor's in Education Science (Hons) Mathematics.

Instrument

This study adopted the questionnaire from Ghana by Enu et al. (2015) was consist the demography section and the section of the student's relationship with classmates, student's relationship with lecturers, student's relationship with family, and online learning with the 5-point Likert-scale instrument which are Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA). The questionnaire items will draw from validated instruments

and established scales pertaining to student's relationship with classmates, student's relationship with lecturers, student's relationship with family and online learning. Before the analysis, the instrument needs to be tested the consistency or stability of measurement by using Cronbach's alpha test. Subsequently, quantitative data analysis will be conducted using statistical software, such as Statistical Package for The Social Sciences (SPSS), commencing with a descriptive analysis that employs measures. This includes mean, standard deviation, and frequency distribution to concisely summarise the data based on respondents' demographics, experienced online learning, and each factor related in this study. Then, the quantitative approach seeks to provide essential data for evaluating the factors that affect the online learning among students specifically concerning their correlations with the impact of the COVID-19 pandemic on online learning. Finally, this analytical framework will facilitate an in-depth understanding of the factors affected in this study.

Analysis, Discussion and Findings

In this discussion, the findings obtained from the analysis based on the questionnaire were explained. In this part, the results were generated from the questionnaire derived from 82 respondents. The data were analysed using SPSS. The results of this study support that the relationship between the student's relationships between peers, lecturers, and parents positively affect to the online learning during Covid-19.

Reliability

This study is utilized Cronbach alpha to investigate the internal consistency of the questionnaires collected from the respondents. All variables of the study gained high inside reliability as shown in below Table 1. This test will allow this study to make further analysis and discussion.

Table 1: Reliability Test

Variables	No of Items	Cronbach's Alpha	Cronbach's Alpha Item Deleted
student's relationship with classmates	7	0.912	0
student's relationship with lecturers	7	0.891	0
student's relationship with family	7	0.905	0
online learning	7	0.834	0
All items	28	0.950	0

Table 1 provide an overview of Cronbach alpha of three variable. According to the result from table, it reflected that all variable is considered as reliable in group of very good which the value ranges from 0.8 to 0.9. It shows student's relationship with classmates with 0.912, followed by student's relationship with family with 0.905, student's relationship with lecturers with 0.891 and online learning with 0.834. Cronbach alpha for all items is 0.950.

Descriptive Statistics

Descriptive statistics are used to explore the data collected and summarise as well as describe them using a table, figure, frequency, percentage, mean and standard deviation. This study involves the relationship between the student's relationships between peers, lecturers, and parents and online learning.

Respondent Demographic

Table 2 below shows the summary of a questionnaire that is distributed and returned by the respondent through Google Form. There are 82 sets of questionnaires were distributed to the respondents to mathematics education students for conducting this research study.

Table 2: Summary Of The Questionnaire That Is Distributed

Number of Questionnaires Distributed	Number of Questionnaire Return	Percent Valid Questionnaire
82	82	100%

Table 3 provides the distribution of frequency and percentage of the demographic respondents. The gender reveals the male respondents involved, with 20 respondents (24%) and 62 respondents (76%) of them are females. Hence, it demonstrates that the number of females is higher compared to male respondents.

Table 3: Respondent's Gender

Gender	Frequency	Percent
Male	20	24
Female	62	76
Total	82	100

Table 4 below demonstrate that 100% of the respondents have experienced online learning in their life.

Table 4: Experience Of Online Learning

Have you ever faced online learning?	Frequency	Percent
Yes	82	100
No	0	
Total	82	100

Table 5 shows the result of mean and standard deviation for each group variables. The result shows that student's relationship with lecturers is important factor during online learning with the highest mean (mean=3.94). It is followed by student's relationship with family (mean=3.78), student's relationship with classmates (mean=3.64) and online learning (mean=3.59).

Table 5: Mean For Each Group Variables

Variables	Mean	Standard Deviation
Student's relationship with classmates	3.64	2.09
Student's relationship with lecturers	3.94	0.57
Student's relationship with family	3.78	2.04
online learning	3.59	1.77

Correlation Analysis

Based on Table 6 below, the student's relationship between classmates and online learning has a strong positive correlation while student's relationship with lecturers and online learning has a moderate positive correlation. Lastly, the student's relationship with family and online learning has a moderate positive correlation.

Table 6: Correlations' Result

	Online learning
Online learning	1
Student's relationship with classmates	0.747**
Student's relationship with lecturers	0.589**
Student's relationship with family	0.628**

**Correlation is significant at the 0.01 level (2-tailed)

Analysis of Variance

Table 7 shows R^2 value indicates that 61.8% of the variance in the outcome of online learning able to predict from the variables of student's relationship with classmates, student's relationship with lecturers and student's relationship with family. Then, another 38.2% of the value of mathematics cannot be explained by the research model but explained by other variables which are not included in this research.

Table 7: Model Summary

Model	R	R Squared	Adjusted R Square
1	0.786	0.618	0.603

Furthermore, Table 8 below shown F-test value is 42.002 at significant level. Based on result, regression model was fit and the independent variables are useful in explaining the variance of the dependent variable.

Table 8: ANOVA^a

Model	Sum of squares	df	Mean Square	F	Sig.
Regression	1098.675	3	366.225	42.002	.000 ^b
Residual	680.105	78	8.719		
Total	1778.780	81			

a. Dependent Variable: Online learning

b. Predictors: (Constant), Student's relationship with classmates, Student's relationship with lecturers and Student's relationship with family

Regression Analyse

Based on **Table 9** below, the coefficient for student's relationship with classmates is 0.435. thus, for every unit increase in student's relationship with classmates, it is expected that 0.435-point increase in online learning. Student's relationship with classmates is statistically significant for the values of mathematics, $p=0.000$.

The coefficient for student's relationship with lecturers is 0.204. thus, for every unit increase in student's relationship with lecturers, it is expected that 0.204-point increase in online

learning. Student's relationship with lecturers is statistically significant for the values of mathematics, $p=0.047$.

The coefficient for student's relationship with family is 0.177. thus, for every unit increase in student's relationship with family, it is expected that 0.177-point increase in online learning. Student's relationship with lecturers is statistically significant for the values of mathematics, $p=0.035$. It shows the most factor that influences the online learning is student's relationship with classmates since the significance is less than 0.05 and the unstandardized coefficient is higher than teacher presentation of content.

The crucial function of regression analysis is to determine whether the research hypotheses are failed to reject or reject. It is defined as a model that gives a straight-line relationship between two or more independent variables and a dependent variable. The table 9 shows that three variables were clarified through regression analysis which used multiple linear regression. From the table, the highest beta is student's relationship with classmates, which is 0.435, followed by student's relationship with lecturers which is 0.204, and lastly is the student's relationship with family which is 0.177. Thus, the lowest beta indicates the lowest important factors between the other independent variables and dependent variables. The significant column shows that all three independent variables are significant.

The regression equation is written as online learning predicted = $3.736 + 0.435 * (\text{Student's relationship with classmates}) + 0.204 * (\text{Student's relationship with lecturers}) + 0.177 * (\text{Student's relationship with family})$.

Table 9: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t-value	Sig.
	B	Std. Error			
(Constant)	3.736	2.260		1.653	0.102
Student's relationship with classmates	0.435	0.082	0.513	5.272	0.000
Student's relationship with lecturers	0.204	0.101	0.181	2.022	0.047
Student's relationship with family	0.177	0.082	0.203	2.149	0.035

a. Dependent Variable: Online learning

Conclusion

Based on the findings analyse above, the researcher was able to conclude the result as shown in Table 10;

Table 10: Summarize Hypothesis Result

	HYPOTHESES	ACCEPTED/REJECTED
H1:	There is no significant relationship between student's relationship with classmates and online learning.	REJECTED
H2:	There is no significant relationship between student's relationship with lecturers and online learning.	REJECTED
H3:	There is no significant relationship between student's relationship with family and online learning.	REJECTED

The most factor that influences the online learning according to the independent variables is student's relationship with classmates. A previous study mentioned that students know that they can rely on their peers for advice and assistance, instrumentally supportive relationships among classmates foster structure and, as a result, feelings of competence (Furrer et al., 2014). In online learning, students engaged in peer interaction in breakout rooms and the chat box. These interactions tended to be tied to encouraging one another or working together to grasp the knowledge better (Keaton and Gilbert, 2020).

The findings indicate a moderately favourable connection and an essential link between students' family relationships and online education. Most respondents concur that speaking with their instructors has been more challenging as well (Mohammad Alawamleh, 2020). These findings are consistent with earlier studies indicating a link between online learning and students' interactions with lecturers. Students generally agreed that their teachers wanted them to succeed and were fair and just in their treatment of them (Wayt, 2012). According to Whitney Keaton and Andrew Gilbert (2020), relationships between students and lecturers may foster a sense of connection and make classes more pleasurable, which may boost participation. Increased student involvement in a course might improve their performance during online learning (Keaton and Gilbert, 2020).

The research results show a moderately positive association between students' relationships with lecturers and online learning, as indicated by the Pearson correlation. This shows that their relationship with their parents impacted their online learning during COVID-19. Relationship with family is essential in deciding whether their online learning will be successful. It is because online education during COVID-19 happens at home where parents are twenty-four-seven. Parents, siblings, and others are essential in helping students with their online learning situation. The result is supported by earlier research where students generally said that their families were interested in how they were adjusting to online learning, expected them to succeed, and encouraged them to pursue academic goals (Wayt, 2012). Family capability support is crucial to online learning engagement. Family capability support is crucial to e-learning engagement. For instance, it determines whether parents can assist in resolving learning challenges and whether they can offer helpful advice in light of the actual learning circumstances (Gao, et al., 2021).

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