



INTERNATIONAL JOURNAL OF
MODERN EDUCATION
(IJMOE)

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E-PEER MENTORING EFFECTIVENESS: A CASE STUDY FOR MATHEMATICS COURSE AT UITM CAWANGAN KELANTAN

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Article Info:

Article history:

Received date: 14.03.2022

Revised date: 30.03.2022

Accepted date: 20.04.2022

Published date: 01.06.2022

To cite this document:

Ramli, M., Ismail, M., Othman, S. A., Kanafiah, S. F. H. M., & Suhaimin, M. F. (2022). E-peer Mentoring Effectiveness: A Case Study For Mathematics Course At Uitm Cawangan Kelantan. *International Journal of Modern Education*, 4 (13), 01-10.

DOI: 10.35631/IJMOE.413001

Abstract:

The universities closures due to the COVID-19 pandemic led to the sudden shift from classrooms to virtual learning and most of the students are unable to be physically around in the campus. This situation has caused some significant problems in teaching and learning not only to the lecturers, but it also affects the students especially in learning mathematics. Hence, the E-Peer Mentoring Program is conducted via online platform as a proactive measure to facilitate the students in learning mathematics. The objectives of this research paper are: first, to determine the significant mean difference between E-Peer Mentoring Program effectiveness and gender, second, to determine the relationship between leadership skills, mentor-mentee relationships, and communication methods between mentor-mentees towards E-peer Mentoring Program effectiveness, and third, to determine the most important factors that contribute to the E-Peer Mentoring Program effectiveness. The questionnaires were distributed to 80 students involved in this program. The findings showed that the E-Peer Mentoring Program effectiveness among student's gender is equal whereas the gender stereotype on how they viewed this program do not apply for these students. The findings also revealed that there were significant positive relationships between leadership skill, mentor-mentee relationships and communication methods between mentor-mentees towards the program effectiveness. From these three factors, only the mentor-mentee relationships

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and communication methods between mentor-mentees were perceived as the most important factors that contributed to the program effectiveness. This suggests that the good relationship between mentor and mentees and effective communication between them had proven to have positive impacts to the program effectiveness.

Keywords:

Virtual Learning, Online Platform, Leadership Skills, Mentor-Mentee Relationships, Communication Methods

Introduction

Mathematics is one of the core subjects in school's education in Malaysia. Mathematics skills are really needed in most of other disciplines including engineering, sciences, social sciences and even the arts. The achievement for this subject has become the focus of interest among educators since it was a compulsory subject for student's admission for most programmes offered in higher education level.

From elementary level to university, mathematical subject is one of the courses that is continuing to be studied and tested. At university, mathematics has become one of a fundamental subject for various fields especially for sciences and technology field, but social sciences are no exception. The myths about mathematics course that are claimed as a difficult course was widespread among students and continue to create the negative beliefs and perceptions about Mathematics among students in general.

The negative perceptions of students regarding mathematics are believed to be one of the factors contributing to this issue. So, to help students especially those who have negative perception, a program is made to change as well as to help students deal with mathematical issues especially during the pandemic, where students need to be more independent to learn. E-Peer mentoring program is made based on the problem of high failure rates among students on the basic subject of mathematics that is pre-calculus. It is conducted to help students from the beginning because the weak foundation also affects the next subject, that is Calculus I and Calculus II. This method is believed has succeeded in lowering the high failure rate for this subject, and at the same time also helps students in related subjects.

Peer mentoring program ensures a win-win situation. Mentor and mentee wins, and hence the main objectives were also achieved where high failure rates can be reduced. Mentee learns from the mentor's guidance, advice, knowledge, and experiences. A peer mentoring program can make a big change and give some impact to the student. To identify the effectiveness of E-peer mentoring program conducted for the students in FSKM, UiTM Kelantan taken Pre-Calculus and Calculus 1 as the study subject, the analysis focused on the leadership skill, relationship and communication of mentors that participated in this program.

Literature Review

As a result of the coronavirus pandemic, many countries are facing a severe situation in terms of global economic and human social activities, including education. The Covid-19 outbreak in Malaysia in 2020 prompted the government to declare a Movement Control Order (MCO), which closed down all educational institutions to prevent the virus from spreading further.

Online learning appears to be the only solution for the education system in response to the implementation of MCO (Yuk Ming Tang et al., 2021).

Many educators were driven to consider online courses since the future is uncertain due to new epidemics. However, there are challenges with online courses that cause students to lose behind due to a lack of face-to-face interactions with instructors, irregular response time, and other reasons, prompting the need to find an alternative approach to online learning.

A university peer-mentoring programme is a type of intervention plan in which one or many students are paired with a more competent student known as a mentor. Therefore, the Faculty of Computer and Mathematical Sciences (FSKM), UiTM Kelantan, took the initiative to conduct an E-peer mentoring programme that provide effective assistance to the students taking Pre-Calculus and Calculus 1 that are considered a challenging subject.

The number of students available at university are vast to participate as a mentor in the peer mentoring programme. But it does not guarantee that they will be interested to join the programme. Most of peer mentors willing to involve in the programme with the mind to give support to help their peer's academic difficulties and from the encouragement from the lecturers. UiTM is promoting students centered learning to replace the lecturers centred learning. So, peer mentoring as a way to encouraged student's academic excellent trough the help from their peers. The peer mentoring conducted provide support and assistance to both commencing students and also students who volunteer to mentor

According to Seery et al. (2021), peer mentors are probably a full-time student, and taking on the position of mentor that presents a variety of interpersonal and emotional concerns. These revealed that the peer mentor's function is primarily focused on giving social and emotional support to the students, allowing them to achieve their maximum potential. Yomtov et al. (2017) investigated the effectiveness of a peer-mentoring programme at a comprehensive California institution. Peer mentorship was found to be effective in improving sentiments of integration and perceived support for the students.

Most of the study on peer mentoring has concentrated on leadership skills, mentor-mentee relationships, and mentor-mentee communication approaches. The ability to lead must be developed in order for mentoring to be successful. North-Samardzic and Cohen (2017) revealed that the improvement of mentors' leadership skills was observed during a mentoring programme. According to Murrell et al. (2021), a peer mentoring programme improved mentors' leadership skills by identifying the significant impact of identity. Other studies previously made similar statements regarding mentors being a greater leader as a result of participating in peer-mentoring programmes. (Esplin et al., 2012; Hall & Jaugities, 2011; Barnes, 2014). However, a foundation must be established for further investigation of leadership development within peer mentoring societies.

On the other hand, mentor-mentee relationships also important in the process. In order to have a good mentoring relationship, the mentor and mentee must work collaboratively. A good mentor delivers great advice, and the mentee feels safe approaching him with any issues. The findings of Beltman et al. (2019) indicated that mentors feel a wide range of positive emotions. Mentors loved engaging with their mentees and sharing their knowledge (Bonin, 2016; Collier, P. J. (2017). Based on those articles, Relationship building is a crucial part of the peer

mentoring programme. A good mentor who are willing to provide guidance on mentees' progress between the mentor and the mentee are required for a high-quality mentoring relationship (Ayokanmbi, 2021). The mentor could participate in any activities with the mentee, such as campus and community events.

Furthermore, excellent communication methods ensuring that the mentor and mentee have clear expectations. Effective communication techniques in peer mentoring programmes allow mentees exchange ideas without misinterpretation. Mentor communication skills and efficacy in dealing with students are improved if they have opportunities to develop skills (Egege & Kutieleh, 2015). Haqquee et al. (2020) discovered that regular self-reflection on mentoring capabilities in order to build communication skills was also valued. In another research by Lim et al. (2017), they stated that the mentors obtained communication and interpersonal skills that they'll never have learned in their normal student situation. All those skills that mentors gained via the mentoring process are extremely valuable to them.

Inspired by the study in literature, this paper aims to identify the effectiveness of E-peer mentoring program conducted for the students in FSKM, UiTM Kelantan taken Pre-Calculus and Calculus 1 subject. The analysis focused on the leadership skill, relationship and communication of mentors that participated in the program is shown in Figure 1.

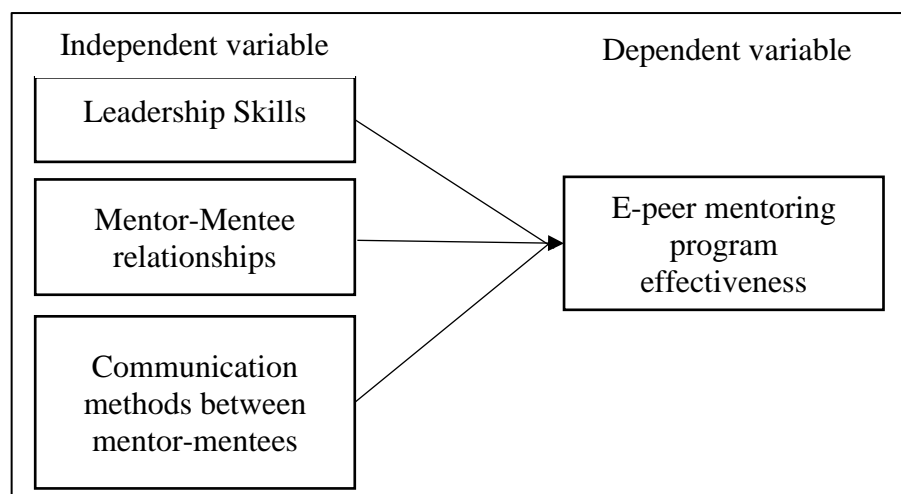


Figure 1: A Conceptual Framework Between Leadership Skills, Mentor Mentee Relationships And Communication Methods Between Mentor-Mentees Towards E-Peer Mentoring Program Effectiveness

Methodology

This research is categorized as a correlational research design. Correlational research design examines the relationship between variables which indicate how two or more variable are related to another variable (Salkind, 2012).

Research Population

The respondents for this research are 80 FSKM students of UiTM Cawangan Kelantan that took part in the E-peer mentoring program which consists of students from Diploma in Mathematical Sciences (CS143) and Diploma in Computer Sciences (CS110) who enrolled Calculus 1 (MAT183) subject during semester Mac – October 2021. Since there are small population of 80 students, this research focusing using all students as census study.

Source of the Data

The source of data for this research is primary data or also known as first-hand source. This research collects the primary data by using questionnaires methods which acquired through questionnaires which adopted from (Siti Farah Haryatie et al., 2013). The questionnaire was designed using 5-point Likert scale; strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). This research has one dependent variable which is E-peer mentoring program effectiveness and three independent variables which are leadership skills, mentor-mentee relationships, and communication methods between mentor-mentees. The data sources include 80 students from CS143 and CS110 program.

Results

Normality Test

In statistics, normality test is used to determine whether a data set is normally distributed. This research uses skewness to measure asymmetry of the probability distribution of a random variable about its mean. The skewness value can be positive or negative, or even undefined. Pallant (2011) stated that -1 to 1 is an acceptable range for the data to be normally distributed.

Table 1: Skewness Result

	Skewness Value
Skewness	0.216

Since the measure of skewness is 0.216 in Table 1 and falls within the range of -1.0 and 1.0, the research can conclude that the data distribution is normally distributed.

Reliability Test

The reliability analysis was conducted by computing the Cronbach's Alpha for each section. The acceptable alpha value in reliability analysis is 0.7 in the ability test case (Kline, 2019). Table 2 below shows that the Cronbach's Alpha values for all variables are greater than 0.762. This indicates that the questions for variables in the questionnaires are valid.

Table 2: Cronbach's Alpha Values

Variables	Cronbach's Alpha	No of question
E-peer mentoring program effectiveness	0.914	3
Leadership Skills	0.901	3
Mentor-Mentee relationships	0.762	3
Communication methods between mentor-mentees	0.764	3

Descriptive Statistics

The descriptive analysis of this research outline the respondents' gender. Table 3 below shows percentages of distribution of frequency for the item gender. Total number of samples is 80 and 61.3% (49) of the respondents are females while the balance 38.8% (31) are males.

Table 3: Gender

Gender	Frequency	Percent (%)
Male	31	38.8
Female	49	61.3
Total	80	100

This research also includes the respondents' semester taken for this Calculus 1 (MAT183) subject. Table 4 below shows percentages of distribution of frequency for the item semester taken for this subject. Total number of samples is 80 and 95% (76) of the respondents that are taken this subject is from semester 2 while the balance is only 5% (4) are students taking this subject from semester 4. These four students are student that are repeating the subject for the 2nd time and currently taking the subject at the semester 4.

Table 4: Semester

Semester	Frequency	Percent (%)
Semester 2	76	95
Semester 4	4	5
Total	80	100

This research also outlines the respondents' time taken for this Calculus 1 (MAT183) subject. Table 5 below shows percentages of distribution of frequency for the item time taken for this subject. Total number of samples is 80 and 62.5% (50) of the respondents that are taken this subject for 2 times while the balance is 37.5% (30) are students taking this subject for the first time.

Table 5: Time Taken

Time taken	Frequency	Percent (%)
1st time	30	37.5
2nd time	50	62.5
Total	80	100

Inferential Statistics

In determining the objectives, a series of test is needed to be done. To determine the significant mean difference of student's perception on mathematics subject among student's gender, independent sample t-test is needed to carry out. Table 6 below indicates that student's perception on mathematics subject is equal among gender. The p-value of Levene test is 0.684 ($p > 0.05$), it shows that there is no significant mean different. This indicates that the variability of the two groups which are male, and female is equal. So, from this research finding, the gender stereotype on how they view e-peer mentoring program effectiveness do not applied for respondents.

Table 6: T-test Results for Student's Gender

Gender	Equal Variances Assumed	F	Sig
		0.166	0.684

Correlation test is performed to determine the relationship between leadership skills, mentor-mentee relationships, and communication methods between mentor-mentees towards e-peer mentoring program effectiveness. Based on the table 7 below, this research founded that, there are significant positive relationship between leadership skills, mentor-mentee relationships, and communication methods between mentor-mentees towards e-peer mentoring program effectiveness ($p < 0.05$). The r-value for mentor-mentee relationships, and communication methods between mentor-mentees are 0.543 and 0.518, respectively. This shows that, each variable has moderate positive relationship with E-peer mentoring program effectiveness. In addition, leadership skills have low positive relationship with E-peer mentoring program effectiveness since the r-value is 0.228.

Table 7: Pearson Correlation Result

Variable	E-peer mentoring program effectiveness		Level
	Pearson Correlation	Significant	
Leadership Skills	0.228	0.042	Low
Mentor-Mentee relationships	0.543	0.000	Moderate
Communication methods between mentor-mentees	0.518	0.000	Moderate

Table 8 shows the model summary for the regression model. The value of R Square is 0.359 shows that 35.9% variation in E-peer mentoring program effectiveness due to the independent variable mentor-mentee relationships, and communication methods between mentor-mentees.

Table 8: Model Summary

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	0.599 ^b	0.359	0.343	0.4524

b. predictors: (Constant), mentor-mentee relationships, communication methods between mentor-mentees.

F-statistics were carried out to find the overall strength of the model. Table 9 shows that, the value of F-Statistic is 21.595 and p-value is less than 0.05 which indicated that the data used in the research fit to the model.

Table 9: Anova Result

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	8.839	2	4.420	21.595	0.000 ^b
	Residual	15.759	77	0.205		
	Total	24.599	79			
	Regression	8.839	2			

a. Dependent Variable: E-peer mentoring program effectiveness

b. Predictors: (Constant), mentor-mentee relationships, communication methods between mentor-mentees

Table 10 below demonstrates the regression model result that shows only two independent variable that significantly influence the E-peer mentoring program effectiveness which are Mentor-Mentee relationships and Communication methods between mentor-mentees ($p < 0.05$).

Table 10: Regression Model Result

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
2 (Constant)	2.527	0.375		6.745	0.000
Mentor-Mentee relationships	0.333	0.100	0.368	3.316	0.001
Communication methods between mentor-mentees	0.157	0.057	0.309	2.783	0.007

a. Dependent Variable: E-peer mentoring program effectiveness

One variable which is Leadership Skills had been removed from the model using stepwise selection method since the p-value are greater than 0.05. Therefore, the final regression model is shown below.

$$Y = B_0 + 0.333 X_2 + 0.157 X_3 \quad (1)$$

E-peer mentoring program effectiveness = $2.527 + 0.333 X_2 + 0.157 X_3$ where

X_2 = Mentor-Mentee relationships

X_3 = Communication methods between mentor-mentees

Conclusion

This research investigated the factors contributing to E-Peer Mentoring Program effectiveness shared by 80 students involved in this program. The results of this research indicated that E-Peer Mentoring Program effectiveness among student's gender is equal whereas the gender stereotype on how they viewed peer mentoring program do not apply for these students. The findings also revealed that there were significant positive relationships between leadership skill (low positive correlation), mentor-mentee relationships (moderate positive correlation) and communication methods between mentor-mentees (moderate positive correlation) towards E-Peer Mentoring Program effectiveness since all the p-values is less than 0.05. Also, out of these three factors, only the mentor-mentee relationships and communication methods between mentor-mentees were perceived as the most important factors that contributed to the E-Peer Mentoring Program effectiveness. This suggests that the mentor and mentee valued the relationship between them and appreciated the effective communication between them. Besides, this E-Peer Mentoring Program is a proof that the current COVID-19 pandemic changes not only the utilization of technology in teaching and learning, but also the pedagogy strategies. Thus, this online peer assisted learning should be encouraged and implemented henceforth.

Future research could be conducted by using larger samples from different courses such as Pre-Calculus and Calculus II and involved all students to improve the generalizability of the results. Besides, another variable can be included in the future research such as altruism and

organizational culture and investigate their relationship towards E-Peer Mentoring Program effectiveness.

References

- Ayokanmbi F. M. (2021). The Role of High-Quality Relationship in Peer Mentoring. *International Journal of Multidisciplinary and Current Research*, 9, 405-409.
- Barnes, S. R. (2014). Exploring the socially responsible leadership capacity of college student leaders who mentor. Master's thesis, University of Nebraska-Lincoln, Lincoln, NE.
- Beltman, S., Helker, K. and Fischer, S. (2019). 'I really enjoy it': Emotional engagement of university peer mentors. *International Journal of Emotional Education*, 11(2), 50–70
- Bonin, E. (2016). Effect of peer mentors on academic performance. *Perspectives in Peer Programs*, 27(1), 1-8.
- Collier, P. J. (2017). Why peer mentoring is an effective approach for promoting college student success. *Metropolitan Universities*, 28(3), 9–19.
- Egege, S., & Kutieleh, S. (2015). Peer mentors as a transition strategy at University: *Why mentoring needs to have boundaries*. *Australian Journal of Education*, 59(3), 265–277.
- Esplin, P., Seabold, J., and Pinnegar, F. (2012). The architecture of a high-impact and sustainable peer leader program: A blueprint for success. *New Directions for Higher Education*, 2012(157), 85-100.
- Hall, R., and Jaugietis, Z. (2011). Developing peer mentoring through evaluation. *Innovative Higher Education*, 36(1), 41-52.
- Haqee, Z., Goff, L., Knorr, K., and Gill, M. B. (2020). The impact of program structure and goal setting on mentors' perceptions of peer mentorship in academia. *Canadian Journal of Higher Education*, 50(2), 24–38.
- Kline, P. (1999). *The Handbook of Psychological Testing* (2nd ed.). London: Routledge.
- Lim, J. H., MacLeod, B. P., Tkacik, P. T., and Dika, S. L. (2017). Peer mentoring in engineering: (Un)shared experience of undergraduate peer mentors and mentees. *Mentoring & Tutoring: Partnership in Learning*, 25(4), 395–416.
- Murrell, A.J., Blake-Beard, S. and Porter, D.M. (2021). The Importance of Peer Mentoring, Identity Work and Holding Environments: A Study of African American Leadership Development. *Int. J. Environ. Res. Public Health*, 18, 4920.
- North-Samardzic, A. and Cohen, M. Peer Mentoring in Higher Education and the Development of Leadership Skills in Mentors. *In Integrating Curricular and Co-Curricular Endeavors to Enhance Student Outcomes*. Published online: 09 Jan 2017; 273-288.
- Pallant, J. (2011). *SPSS survival manual: A Step-by-Step Guide to Data Analysis Using the SPSS Program*. Berkshire: Open University Press.
- Salkind, N. J. (2012). *Exploring research*. Boston: Pearson.
- Seery, C., Andres, A., Moore-Cherry, N. et al. (2021). Students as Partners in Peer Mentoring: Expectations, Experiences and Emotions. *Innov High Educ*. Springer.
- Siti Farah Haryatie, M. K., & Azlina, J. (2013). Students' Perception Towards Mathematics: Attitudes, Interest and Lecturers' Teaching. *International Symposium on Mathematical Sciences and Computing Research*, 133-136.
- Tang, Y. M., Chen, P. C., Kris M.Y L., Wu, C.H., Law, Y. Y., Guan, J., He, D. and Ho, G. T. S. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computer and Education*. 168, 104211.

Yomtov, D., Scott W. P., Efrat, R. and Marin A. G. (2017). Can Peer Mentors Improve First-Year Experiences of University Students. *Journal of College Student Retention: Research, Theory & Practice*. 19 (1), 25-44.