Students' Attitudes and Motivation Towards a Student-Centered Approach in Mathematics Mentoring Programs Among Secondary School Students

Mohamad Saifullah Pauzi[1], Nor Hafizah A Hamid[2*] and Suhalia Safiai[3]

[1]Faculty of Education, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, Bandar Puncak Alam, 42300 Puncak Alam, Selangor, Malaysia

[2,3]Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia

***Corresponding Author**

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ABSTRACT

In recent years, student-centered learning (SCL) approaches have seen increased public interest as an effective way of enhancing academic performance and student engagement. The purpose of this study is to identify factors related to students' attitudes and motivation within a student-centered mathematics mentoring framework in secondary school in Shah Alam, Selangor. The data were collected through a quantitative approach using adapted 5-point Likert scale questionnaires from 110 stratified participants from different academic performance levels. The questionnaire consists of demographic data and information on students' attitudes and motivation levels. Independent T-test results revealed no significant effect of gender on either attitude or motivation levels. Furthermore, a one-way ANOVA revealed significant differences in students' attitude and motivation levels among classes. Students' attitudes and overall motivation were strongly positive correlated, as indicated by a Pearson correlation analysis (r=0.766). The findings indicate that the educational interventions should move away from gender-specific issues and should focus on basic of teaching methods and differentiated mentoring to help less performing students successfully transition from traditional, teacher-centered practices to active, peer-centered environments.

Keywords: Student-centered learning, Mentor-mentee, Academic Attitude, Mathematics Motivation, Secondary education

INTRODUCTION

Mathematics functions as a core cognitive toolkit in everyday life for problem-solving and decision-making, and it is used in activities such as health monitoring, budgeting, technology use, and cooking. Mastery of the subject helps to boost cognitive capacities by improving critical thinking and analytical capabilities, which are in high demand among companies (Zulia, 2023). In the dynamic environment of 21st-century learning, the choice between teacher-centered and student-centered approaches has become a key point in defining effective educational practices. The conventional teacher-centered approach, which has been dominant for centuries, places the educator at the center, transmitting knowledge to passive students. Although this approach offers organization and effective information communication, it often overlooks individual learning preferences and hampers the development of analytical thinking skills. Meanwhile, the student-centered approach promotes active participation, cooperation, and analytical thinking. This strategy improves critical thinking skills by prompting students to analyze material and assess the credibility of sources.

Integrating student-centered approaches into peer mentoring holds significant promise for enhancing secondary school mathematics achievement. Mentoring is a form of communication that consists of encouragement,

emotional support, and academic guidance to help students realize their full potential. Their ultimate objective is to shape mentees into productive contributors to society. However, there are a handful of students who still do not get satisfactory results in examinations, even though the school has introduced and implemented the student-centered approach in mentor-mentee relationships to improve their academic achievement, especially in mathematics. To understand why this disconnect occurs, this study was conducted to identify the factors related to students' attitudes and motivation towards the student-centered approach in mentor-mentee relationships for mathematics among secondary school students.

LITERATURE REVIEW

A student-centered approach is a model, method, or learning strategy that places students or learners at the centre of the teaching-learning process to promote individual interest, motivation, and the ability to be more active, creative, and innovative in their learning. Empirical work by Muhammad Z (2007) stated that shifting to student-centered learning (SCL) had a positive impact on most students, even though a few students remained anxious about achieving conventional grades under the new system. Similarly, Soubra et al. (2022) reported a comparable finding by assessing the impacts of two student-centered instructional strategies, which are problem-based learning (PBL) and just-in-time teaching (JiTT). Both the online PBL and the JiTT had significant impacts on students' learning abilities and skills. The SCL approach can effectively create an interactive and relevant learning experience that fosters key competencies such as independence and critical problem-solving (Paduppai, 2025). According to Rahmah (2025), the PBL approach can increase student engagement. The results showed that the model improves students' conceptual mastery and critical thinking skills and prepares them to deal with challenges in the work environments of technology.

However, translating SCL models into peer-led mentor-mentee relationships introduce distinct interpersonal challenges, particularly related to uneven student enthusiasm. Mathematics frequently trigger academic anxiety, and mentees assigned to these programs do not always share an enthusiasm for the subject. According to Muda and Azmi (2017), students' motivation to learn increases when they are interested in the subject. Students' achievement will be affected indirectly if they have a negative attitude and are uninterested in the subject.

Another challenge related to the student-centered approach in mentor-mentee is communication skills among students assigned as mentors. Effective communication allows for the clear transmission of ideas and information (Yusof, 2009). However, not all mentors have outstanding communication skills, especially if the mentor is a fellow student. This is consistent with the findings of Ismail (2014), who demonstrated that the quality of communication and emotional support positively correlated with study performance. According to Al-Aqeel (2024), mentees experienced positive feedback with some challenges such as severe time constraints, misaligned expectations between mentees, and a lack of student engagement.

RESEARCH METHODOLOGY

This study utilized a quantitative, correlational survey design to capture the relationship between student attitudes and motivation within an active mentoring structure. The sample comprised 110 secondary students from a secondary school in Shah Alam, Selangor. A stratified selection-based strategy across three different classrooms used to capture a broad range of academic achievement categorized based on their historical mathematics test results, which were excellent (Palladium class), moderate (Iridium class), and poor (Platinum class). Data collection was executed via a structured three-part questionnaire adapted from Mohamad et al. (2020), originally validated for measuring engineering student attitudes and motivation toward participation in student-centered learning activities. Part A captured participant demographics. Part B and Part C examined students' attitudes and motivational constructs toward the student-centered approach in the mathematics mentoring programs using 10 items each, measured on a standard 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability of the instruments was assessed, and Cronbach's Alpha coefficient was computed using IBM SPSS Statistics. Table 1 presents the reliability statistics of the research instruments. The attitude subscale had a Cronbach's Alpha of 0.841, and the motivation subscale 0.819. Both values are higher than the cut-off point of 0.70, which indicates that the instruments used in this study have good reliability.

Table 1. Reliability Statistics

Part	Items	Cronbach Alpha	No. of items
B	Students' attitude	.841	10
C	Students' motivation	.819	10

ANALYSIS AND DISCUSSION

Demographic Background

The findings for Part A encompass the demographic distribution of the 110 participating students.

Table 2. The Distribution of Respondents based on Gender

Gender	Frequency	Percentage (%)
Male	52	47
Female	58	53
Total	110	100

The gender balance shows a relatively even split: 52 male respondents (47%), and 58 female respondents (53%).

Table 3. The Distribution of Respondents based on Class

Class	Frequency	Percentage (%)
Palladium	35	32
Iridium	39	35
Platinum	36	33
Total	110	100

Academic tracking distributions were equally balanced, with Palladium, Iridium, and Platinum classroom accounting for 32%, 35%, and 33% of the total sample, respectively.

Students' Attitudes Towards the Student-Centered Approach in the Mathematics Mentoring Programs

Table 4. Descriptive Summary of Student Attitudes

N	Mean	Standard deviation (SD)
110	3.70	1.007

Table 4 indicates the mean scores and standard deviations of students' attitudes toward the student-centered approach in the mathematics mentoring programs. The overall mean score was 3.70 (SD = 1.007), indicating a generally positive attitude across the evaluated items. To evaluate whether these attitudinal scores varied by gender, an independent-samples t-test was conducted to compare the mean attitude scores between male and female students. The hypotheses tested were as follows:

H_0 – There is no significant difference in students' attitudes between male and female students.

H_1 – There is a significant difference in students' attitudes between male and female students.

Table 5. Independent T-test for Students' Attitude

Levene's Test for Equality of Variances						
		F	Sig.	T	df	Sig. (2-tailed)
Attitude	Equal variances assumed	11.654	.001	-.830	108	.408
	Equal variances not assumed			-.809	81.898	.421

According to the results presented in Table 5, Levene's Test for Equality of Variances yielded a significant result ($F = 11.654, p = 0.001$), demonstrating that variances between the male and female subgroups were unequal, indicating no significant difference between the groups ($t = -0.809, df = 81.898, p = 0.421$). Because the p-value falls above the standard 0.05, the null hypothesis (H_0) was not rejected. The attitude profiles of male and female secondary students are unaffected by statistical differences with respect to student-centered mentoring models.

Subsequently, a one-way ANOVA was conducted to compare the mean attitude scores among students from different classes. The hypotheses tested were as follows:

H_0 - There is no significant difference in students' attitudes among classes.

H_1 - There is a significant difference in students' attitudes among classes.

Table 6. ANOVA Summary for Students' Attitudes

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.391	2	5.696	17.807	.000
Within Groups	34.225	107	.320		
Total	45.617	109			

As shown in Table 6, the ANOVA output reveals a statistically significant difference in attitude scores among classes, with F(2, 107) = 17.807 and p < 0.001. Therefore, the null hypothesis was rejected. This result indicates a significant difference in students' attitudes toward the student-centered approach in mathematics mentoring programs among classes.

Students' Motivation Towards the Student-Centered Approach in Mathematics Mentoring Programs

Table 7. Descriptive Summary of Student Motivation Levels

N	Mean	Standard deviation (SD)
110	3.88	0.921

Table 7 presents the statistical summary of respondents' motivation levels towards the student-centered approach in the mathematics mentoring programs. The overall mean score was 3.88 (SD = 0.921), indicating a generally high and consistent level of agreement among respondents. Next, an independent- samples t-test was conducted to compare mean motivation scores between male and female students. The hypotheses tested were as follows:

H_0 – There is no significant difference in students' motivation levels between male and female students.

H_1 – There is a significant difference in students' motivation levels between male and female students.

Table 8. Independent T-test for Students' Motivation Level

Levene's Test for Equality of Variances						
		F	Sig.	T	df	Sig. (2-tailed)
Motivation	Equal variances assumed	2.552	.113	.149	108	.882
	Equal variances not assumed			.146	94.203	.884

Levene's test met the assumption of equal variances ($F = 2.552, p = 0.113$). The standard t-test output shows that motivation levels do not differ significantly between male and female students ($t = 0.149, df = 108, p = .882$). Since the p-value exceeds 0.05, the null hypothesis was not rejected. This indicates that there is no significant difference in students' motivation levels towards the student-centered approach in mathematics mentoring programs between male and female students. Gender does not appear to influence motivational support

for peer mentoring. A one-way ANOVA was then conducted to compare the mean motivation scores among classes. The hypotheses tested were as follows:

H_0 - There is no significant difference in students' motivation levels among classes.

H_1 - There is a significant difference in students' motivation levels among classes.

Table 9. ANOVA Summary for Students' Motivation Level

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.910	2	2.955	10.727	.000
Within Groups	29.474	107	.275		
Total	35.384	109			

The findings showed that the difference in scores among classes was statistically significant, F (2, 107) = 10.727, $p < 0.001$. Consequently, the null hypothesis was rejected. This result indicates significant differences in students' motivation toward a student-centered approach in the mathematics mentoring programs across classes. A Pearson correlation analysis was conducted to determine whether a relationship exists between students' attitudes and motivation levels. The hypotheses tested were as follows:

H_0 - There is no significant relationship between students' attitudes and motivation levels

H_1 - There is a significant relationship between students' attitudes and motivation levels

Table 10. Pearson Correlation of Attitude and Motivation Levels of Students

		Attitude	Motivation
Attitude	Pearson Correlation	1	.766**
	Sig. (2-tailed)		.000
	N	110	110
Motivation	Pearson Correlation	.766**	1
	Sig. (2-tailed)	.000	
	N	110	110

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

The Pearson correlation analysis revealed a strong, positive, and statistically significant relationship between students' attitudes and motivation levels ($r = 0.766, p < 0.001$). This result shows that the students' attitudes and motivation levels toward a student-centered approach in mathematics mentor-mentee programs positively related. A similar finding is reported by Faiz and Karasu Avci (2020), who found that academic motivation was positively associated at the intermediate level with students' attitude towards the subjects of Social Studies. In other words, as academic motivation rises, so does interest in the subject course. Therefore, to make the student-centered mentor-mentee approach effective, attitude and motivation need to be emphasized among students to make teaching and learning more interesting and to improve their achievement, especially in mathematics.

Students' attitude and motivation toward a student-centered approach show a general tendency towards positive responses across the assessed items. This finding is consistent with the study by Mohamad et al. (2020), which indicated strong student acceptance and high mean scores for active learning methodologies among technical tracks. Similarly, Upadhya and Lynch (2019) found that student motivation was higher for the student-centered group than the teacher-centered group.

There is a significant difference in the attitude and motivation level of students towards the student-centered approach among classes. High-motivation students tend to respond positively to external motivators such as commendation, rewards, and academic recognition, which, in turn, improve their participation and learning behavior (Royer & Ennis, 2024; Pérez et al., 2025). Therefore, a good classroom environment is essential for

increasing students' learning. The research findings reveal no significant differences in students' attitudes and motivation levels across genders. The statement is supported by a study by Mohamad et al. (2020), which reports no difference in the attitude levels of engineering students, male and female, towards student-centered learning. However, this finding contradicts with Fatimah (2018), who found that gender had a significant influence on students' mathematical problem-solving abilities.

CONCLUSION

These research findings are important to students, teachers, parents, and school authorities, as they provide valuable insights into students' attitudes and motivation towards the student-centered approach in mentor-mentee relationships in mathematics. This study highlights that secondary students' engagement with student-centered mathematics mentoring is shaped by their academic track rather than their gender. The strong, positive correlation between attitude and motivation suggests that instructional programs need to target both of these areas to be effective. For school administrators and policymakers, these findings suggest that instead of designing gender-specific programs, resources should focus on targeted training programs for teachers. Helping them shift from traditional, teacher-focused practices to more student-centered approaches, ensuring lower-performing classrooms receive the structured support needed to build independent learning skills. In addition, the school can benefit from this research by arranging programs for students and teachers, thereby promoting understanding of the differences between teacher-centered and student-centered approaches. Finally, students can utilize this research to improve academic performance and foster crucial interpersonal qualities such as effective communication and strong leadership.

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