Original Research Article

The Relationship of Peer Tutoring Experience on the Academic Motivation of Junior High School Students in Mathematics

.

ABSTRACT

|  |
| --- |
| **Aims:** This study aimed: (1) to determine the level of peer tutoring experience among peer tutors in mathematics across five dimensions: academic, social, professional, personal, and psychological; (2) to assess the level of academic motivation in terms of intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety; and (3) to determine the relationship between peer tutoring experience and academic motivation.**Study design:** Descriptive Correlational Design**Place and Duration of Study:** The scope was confined to secondary schools within the Schools Division of the City of Mati that offer mathematics tutoring programs during the School Year 2024–2025. The study excluded senior high school peer tutors and limits its focus to the motivational outcomes of Junior High School peer tutors.**Methodology:** A complete enumeration of 40 Junior High School Mathematics peer tutors from the Schools Division of the City of Mati, Davao Oriental, Philippines was employed for this study. An adapted questionnaire was utilized to assess peer tutoring experiences and academic motivation. Mean scores were computed to determine the levels of peer tutoring experience and academic motivation, while Pearson’s correlation coefficient was used to assess the relationship between the tutoring experience and academic motivation.**Results:** Findings revealed that participants reported a very high level in the psychological dimension and high levels in the remaining four dimensions of the peer tutoring experience. All six dimensions of academic motivation registered high levels. Pearson’s correlation coefficient revealed a statistically significant positive relationship between peer tutoring experience and academic motivation (r = 0.686, p < .001). **Conclusion:** Peer tutoring is strongly linked to higher academic motivation. Tutors with more positive experiences showed greater interest, confidence, and purpose in learning Mathematics. Thus, peer tutoring should be acknowledged and promoted by school administrators as a strategic approach that benefits learners including academically proficient students. |

*Keywords: academic motivation, junior high school students, peer tutoring*

1. INTRODUCTION

Low student motivation has increasingly been recognized as a critical factor affecting mathematics achievement across educational settings. Studies show that amotivation and low perceived competence are strongly associated with poor performance and negative emotional experiences in mathematics (Rodríguez et al., 2021; Tran & Nguyen, 2021). In response, peer tutoring has emerged as a widely recognized and effective intervention, which demonstrates positive effects on students' academic performance, critical thinking, and problem-solving skills (Longjohn & Kenneth, 2022 ; Putranto et al., 2022; Ximenes et al., 2023).

While numerous studies emphasize the benefits for tutees, less attention has been given to exploring the impact of peer tutoring on the academic motivation of the tutors themselves (Rahman et al., 2020). Peer tutoring has been widely implemented in various educational contexts, ranging from elementary schools to universities, and across disciplines such as Mathematics, statistics, and engineering (Alegre et al., 2019; Biju, 2019; Dąbrowska & Dąbrowska, 2022; Elbulok-Charcape et al., 2020; Moumoulidou et al., 2020; Russo, 2019; Singh, 2023). This method has been shown to provide numerous benefits, including improved learning outcomes and enhanced engagement, particularly for struggling students (Elbulok-Charcape et al., 2020).

Research suggests that peer tutoring enhances learning for both tutees and tutors, as the latter reinforce their own understanding by teaching and engaging actively in the learning process (Mama et al., 2024). However, peer tutors often encounter challenges, such as managing time effectively and balancing academic responsibilities, which can affect their experiences and performance (Alegre et al., 2019; Elbulok-Charcape et al., 2020). These challenges underscore the need to examine tutors' perspectives to better understand their unique experiences and the factors influencing their participation (Moumoulidou et al., 2020; Russo, 2019).

Motivation plays a critical role in sustaining peer tutors' engagement and effectiveness in tutoring programs (Russo, 2019; Singh, 2023). Intrinsic factors, such as the personal satisfaction of helping others, and extrinsic factors, like recognition or academic rewards, are key motivators for peer tutors (Alegre et al., 2019; Dąbrowska & Dąbrowska, 2022). Addressing these motivational factors is essential for creating effective programs that support both the academic and personal development of tutors and tutees alike (Biju, 2019; Russo, 2019).

In this context, peer tutoring sessions have been linked to significant improvements in academic performance, indicating that tutors solidify their understanding through the act of teaching (Atamosa & Dioso, 2024). Additionally, academic motivation plays a pivotal role in shaping educational outcomes, as it affects how students approach tasks, tackle challenges, and maintain engagement in learning (Raboca & Cărbunărean, 2024; Shirvani et al., 2024). However, if insufficient attention is given to the motivational experiences of tutors, it may impede their continued participation and diminish the overall effectiveness of peer tutoring programs (Rahman et al., 2020).

Despite the well-documented benefits of peer tutoring in Mathematics, challenges remain in fully harnessing its potential to improve both academic performance and motivation. Research has consistently demonstrated that peer tutoring enhances academic achievement across various educational levels (Alegre et al., 2020; Ullah & Kaleem, 2020), while simultaneously fostering greater motivation, self-efficacy, and interest in mathematics (Han et al., 2024; Roberts & Spangenberg, 2020). Furthermore, peer tutoring contributes not only to the academic success of tutees but also to the personal and academic growth of tutors, strengthening their critical thinking, problem-solving skills, and metacognitive abilities (Finlay, 2019).

The effectiveness of peer tutoring is closely linked to academic motivation, which serves as a critical factor for success. For instance, the motivational levels of both tutors and tutees can significantly influence the overall impact of the program (Boadu et al., 2023). While peer tutoring has been particularly beneficial for struggling students, including those in higher education (Salani & Sekgoma, 2024), the motivational challenges faced by peer tutors themselves are often overlooked, despite their importance to the program’s success.

In Colombia, implementing peer tutoring programs faces several challenges that impact their effectiveness. One significant barrier is tutor motivation, as peer tutors often struggle to maintain enthusiasm and commitment, which can result in disengagement or burnout (Escobar et al., 2025). Resistance from both tutors and students further complicates the implementation, with some tutors doubting their ability to teach effectively and students reluctant to embrace peer-led learning (Mackenzie, 2021). Additionally, low attendance in peer tutoring sessions is a persistent issue, as students face competing academic and extracurricular demands, and inconsistent participation disrupts the continuity of the program, hindering academic progress (Escobar et al., 2025). In Japan, peer tutoring programs face challenges such as differences in tutoring styles, where varying teaching methods may not align with students' learning preferences, with tutors sometimes struggling to explain advanced concepts to more proficient students and often experience burnout from balancing academic responsibilities with tutoring and may feel unsupported if their efforts go unrecognized (Ota, 2019).

In the Philippines, peer tutoring in mathematics faces several challenges. Students often lack fundamental mathematical skills and struggle with problem-solving (Bercasio & Cabrillas, 2019). Tutors encounter difficulties in explaining mathematical concepts and proofs (Rahman et al., 2020; Yaman, 2017). In Mindanao, peer tutors encounter difficulties such as students' lack of mathematical fundamentals, distracted focus, and time constraints (Bongga, 2024). Academic motivation plays a crucial role in mathematics learning, with studies showing that attitudes towards mathematics mediate the relationship between academic self-efficacy and motivation to learn (Camacho, 2022; Comahig & Abuzo, 2024).

Hidayat et al. (2023) emphasized that, while some research has explored the benefits for peer tutors, most studies have focused on tutee outcomes which highlights the need for more research on the experiences and challenges faced by peer tutors. Research indicates that the motivation of peer tutors can significantly impact the success of peer tutoring programs, yet little attention has been paid to the factors influencing tutors’ academic motivation. Additionally, while some studies suggest peer tutoring yields greater benefits in primary education, others report comparable effects across educational levels (Alegre et al., 2020), which raises questions about its universal applicability.

This study focuses on the experiences and motivation of peer tutors in a mathematics tutoring program which aims to shed light on the challenges they face, the factors that motivate them, and the overall impact of their involvement in the Schools Division of the City of Mati. Understanding these dynamics is critical to designing effective peer tutoring programs that not only support tutees but also foster sustained motivation and growth among tutors. The findings aim to contribute to the optimization of peer tutoring strategies to ensure their effectiveness and sustainability across diverse educational settings.

By examining the relationship between peer tutoring and academic motivation, the study seeks to provide valuable insights into how same-age peer tutoring can enhance both student achievement and motivation. Given the challenges faced by schools in Mati City, particularly in mathematics education, the findings of this research could inform local educational practices and policies. Additionally, the study aspires to contribute to the broader educational landscape by providing evidence of how peer tutoring can serve as an effective, scalable intervention for improving mathematics education, especially in resource-constrained settings.

* 1. **Research Questions**

This study sought to address the following questions:

1. What is the level of peer tutoring experience of peer tutors in mathematics in terms of:
	1. Academic dimension;
	2. Social dimension;
	3. Professional dimension;
	4. Personal dimension; and
	5. Psychological dimension?
2. What is the level of academic motivation of peer tutors in Mathematics in terms of:
	1. Intrinsic value;
	2. Attainment Vaue;
	3. Self-regulation;
	4. Self-efficacy;
	5. Utility value; and
	6. Test anxiety?
3. Is there a significant relationship between the level of peer tutoring experience and the academic motivation of peer tutors in mathematics?
	1. **Research Objectives**

This study aimed to achieve the following objectives:

1. To determine the level of peer tutoring experience of peer tutors in mathematics in terms of:

1.1. Academic dimension;

1.2. Social dimension;

1.3. Professional dimension;

1.4. Personal dimension; and

1.5. Psychological dimension.

2. To assess the level of academic motivation of peer tutors in mathematics in terms of:

2.1. Intrinsic value;

2.2. Self-regulation;

2.3. Self-efficacy;

2.4. Utility value; and

2.5. Test anxiety.

3. To determine the significant relationship between the peer tutoring experience and the academic motivation of peer tutors in mathematics.

**1.3 Null Hypothesis**

There is no significant relationship between the peer tutoring experience and the academic motivation of peer tutors in mathematics.

**1.4 Theoretical Framework**

This study is grounded in two key educational theories: Experiential Learning Theory (ELT) by Kolb (1984) and Self-Determination Theory (SDT) by (Deci & Ryan, 2008), both of which offer insights into the impact of peer tutoring on academic motivation. ELT emphasizes that knowledge is actively constructed through the transformation of experience, and its cyclical model, comprising concrete experience, reflective observation, abstract conceptualization, and active experimentation, supports deeper learning by linking hands-on activities with reflective practice as cited by (Rahmi, 2024). Studies have demonstrated the effectiveness of ELT in promoting motivation and engagement, highlighting how experiential learning fosters active participation and meaningful learning (Kong, 2021). On the other hand, SDT focuses on the psychological needs that drive motivation, namely autonomy, competence, and relatedness, all of which contribute to intrinsic motivation and well-being (Ryan & Deci, 2020). Research supports the idea that satisfying these needs enhances students' intrinsic motivation and academic satisfaction (Wang & Sperling, 2020).

Incorporating both theories, this study aims to understand how peer tutoring can be structured to enhance both motivation and engagement. ELT, with its focus on hands-on learning and reflection, provides a foundation for creating engaging experiences, while SDT emphasizes the importance of meeting psychological needs to foster motivation (Guay, 2021). In the context of this study, ELT explains how experiential engagement promotes growth in the five dimensions: academic, social, professional, personal, and psychological, as tutors cycle through concrete experience, reflection, conceptualization, and active experimentation. Specifically, tutors deepen content mastery in academic dimension, build empathy and relationships in social dimension, cultivate professional skills in professional dimension, develop confidence in personal dimension, and strengthen emotional resilience in psychological dimension by continually experiencing, reflecting upon, and adapting their tutoring practices. Simultaneously, SDT highlights why these experiential processes enhance academic motivation across six dimensions: intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety. Through peer tutoring experiences explained by ELT, tutors experience enhances autonomy, competence, and relatedness thereby increasing their enjoyment in intrinsic value, achievement orientation in attainment value, learning strategies in self-regulation, confidence in self-efficacy, and perceived relevance of math in utility value. Moreover, positive peer interactions foster relatedness, which reduces negative experiences like anxiety test anxiety. Thus, ELT and SDT integrate seamlessly to clarify how the practical, reflective nature of peer tutoring systematically fulfills psychological needs, which fosters both comprehensive developmental growth and sustained academic motivation.

2. material and methods

2.1 Research Design

Descriptive correlational design was used in the study. Standardized survey questionnaire was used to assess peer tutors' experiences across the academic, social, professional, personal and psychological dimensions.

Similarly, academic motivation was measured using a standardized scale that captured six components: intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety. Descriptive statistics was used to evaluate the levels of academic motivation among the peer tutors (Adhikari & Timsina, 2024).

2.2 Participants

Complete enumeration was employed to include the entire population of 40 Junior High School mathematics peer tutors, who actively took part in the peer tutoring program during the School Year 2024–2025 within the Schools Division of the City of Mati, Davao Oriental, Philippines. This approach ensured that every eligible peer tutor was included in the study for a full representation of the population and eliminated the sampling bias. The decision to use complete enumeration was driven by the manageable size of the target population and the need for a thorough examination of the tutors’ experiences and motivations. By collecting data from all peer tutors, the study captured a nuanced understanding of the trends and relationships across all respondents, which ensured the reliability and generalizability of the findings within the study’s context.

The inclusion criteria were as follows: participants must have an average grade of 85 or above in Mathematics and must have actively participated in the mathematics peer tutoring program for at least one quarter. These criteria ensured that the selected peer tutors have sufficient experience to meaningfully reflect on their roles and contributions. The study included all Junior High School students who engaged in peer tutoring in mathematics during the academic year, which depicted that the sample reflects the experiences of those with substantial exposure to the program. This approach helped capture general trends in academic motivation among a broad and diverse sample of peer tutors.

**2.3 Research Instrument**

This study employed a quantitative approach using a structured survey questionnaire to assess the peer tutoring experiences and academic motivation of Junior High School mathematics peer tutors. The questionnaire items were carefully adapted or modified from validated sources to ensure both validity and reliability.

The peer tutoring experience section was adapted from the survey developed by Sultan Qaboos University (SQU), as seen in Al Kharusi (2016) study titled "What Positive Impacts Does Peer Tutoring Have Upon the Peer Tutors at SQU?" While the original tool combined social and professional, as well as personal and psychological dimensions, this study modified the framework by separating each into distinct categories: academic, social, professional, personal, and psychological, to allow for more detailed analysis of peer tutors’ experiences. In total, this questionnaire consisted of 32 items distributed across these five dimensions: academic (10 items), social (5 items), professional (5 items), personal (8 items), and psychological (4 items). For instance, the items related to knowledge reinforcement, collaboration, and personal development were adjusted to address the unique responsibilities of peer tutors in mathematics (Al Kharusi, 2016).

In addition, the academic motivation section was adapted from the Mathematics Motivation Questionnaire (MMQ) developed by Fiorella et al. (2021) and supplemented with components of Ryan & Deci (2020) Self-Determination Theory. Key components such as intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety were revised to fit the specific context of peer tutoring (Fiorella et al., 2021). This questionnaire comprised 28 items, organized into six constructs: intrinsic value (5 items), attainment value (3 items), self-regulation (5 items), self-efficacy (5 items), utility value (7 items), and test anxiety (3 items).

The questionnaire underwent a modification process, followed by validation by three experts to ensure content validity. Subsequently, a pilot testing was conducted involving 30 participants to establish the instrument’s reliability. The results of the pilot test were analyzed using Cronbach’s alpha, with a target threshold of 0.70 or higher, which ensured the instrument’s reliability (Ventura-León & Peña-Calero, 2020). The peer tutoring experience survey demonstrated excellent internal consistency as indicated by a Cronbach’s alpha of 0.932. Similarly, the academic motivation scale was also pilot tested; two items were identified as problematic and were removed. After this refinement, the scale achieved a Cronbach’s alpha of 0.910, indicating excellent internal consistency. These results affirmed the reliability and robustness of the instrument used in this study.

**2.4 Data Gathering**

After obtaining approval from the university ethics research board and school administration, the researcher distributed the questionnaires to the respondents during a scheduled meeting. All participants were informed about the purpose of the study, their rights as participants, and the voluntary nature of their involvement. Informed consent forms were obtained from each participant in compliance with ethical guidelines for educational research (Briggs, 2019).

To ensure high response rates and minimize data collection errors, the researcher collected the completed questionnaires immediately after the meeting. This approach, as recommended by Ikart (2019), helped to prevent delays and ensures that all data are collected in a controlled environment. The collected data were securely stored, and only the research team could have access to it to maintain confidentiality and data protection. Ethical protocols were strictly adhered to throughout the data collection process.

The data collected were quantitative in nature, derived from respondents' ratings on Likert-scale items within the structured questionnaire. This quantitative data captured the respondents' perceptions of their peer tutoring experiences and their levels of academic motivation. The peer tutoring program implemented was a same-age peer tutoring arrangement, wherein peer tutors and tutees came from the same grade level (Alegre et al., 2021). Specifically, Peer Tutoring Experience was measured across five dimensions: academic, social, professional, personal and psychological, using Likert-scale responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Academic Motivation will be assessed through six components: intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety, also using Likert-scale responses. These quantitative data types allowed for numerical analysis, which was crucial for identifying trends, averages, and relationships between variables. The Likert-scale approach enabled the study to quantify subjective experiences and provide a standardized method for capturing the depth of respondents' feelings and attitudes (Kagerbauer & Magdolen, 2024).

**2.5 Data Analysis**

Quantitative analysis addressed the three objectives. Descriptive statistics (means and standard deviations) were used to summarize peer tutoring experiences across academic, social, professional, personal, and psychological dimensions, and to profile academic motivation factors including intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety. Interpreting means against pre-set five-point verbal ranges enabled clear categorization of experience and motivation levels. Tables were used to present a comprehensive overview of peer tutors’ experiences and academic motivation, with Table 1 providing the interpretation guide for both constructs

Pearson’s correlation was used to examine the relationship between experience dimensions and motivation components. Correlation coefficients ranged from -1 to +1, and a significance level of P < 0.05 indicated the strength and direction of these relationships, as shown in Table 2.

**Table 1. Interpreting Mean Results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Mean Range** | **Descriptive Equivalent** | **Interpretation****(Peer Tutoring Experience)** | **Interpretation****(Academic Motivation)** |
| 4.20 – 5.00 | Very High | The student tutor exhibits a very high level of peer tutoring experience. | The student tutor exhibits a very high level of academic motivation. |
| 3.40 – 4.19 | High | The student tutor demonstrates a high level of peer tutoring experience. | The student tutor demonstrates a high level of academic motivation. |
| 2.60 – 3.39 | Moderate | The student tutor has a moderate level of peer tutoring experience. | The student tutor has a moderate level of academic motivation. |
| 1.80 – 2.59 | Low | The student tutor shows a low level of peer tutoring experience. | The student tutor shows a low level of academic motivation. |
| 1.00 – 1.79 | Very Low | The student tutor exhibits a very low level of peer tutoring experience. | The student tutor exhibits a very low level of academic motivation. |

**Table 2. Interpreting Pearson’s r Coefficient**

|  |  |  |
| --- | --- | --- |
| **Interval Coefficient** | **Relationship Level** | **Interpretation** |
| 0.00 to 0.19 | Very Weak | There is a very weak or no significant relationship between the two variables. |
| 0.20 to 0.39 | Weak | A weak relationship exists, with minimal correlation between the two variables. |
| 0.40 to 0.59 | Moderate | A moderate relationship exists, with a noticeable correlation between the two variables. |
| 0.60 to 0.79 | Strong | A strong relationship exists, with a significant correlation between the two variables. |
| 0.80 to 1.00 | Very Strong | A very strong relationship exists, with a high degree of correlation between the two variables. |

3. results and discussion

Presented in this chapter are the results of the data gathered in relation to the research objectives and questions of the study. Specifically, the data were analyzed and interpreted to determine the level of peer tutoring experience of peer tutors in mathematics across five dimensions: academic, social, professional, personal, and psychological. Additionally, their academic motivation was assessed in terms of intrinsic value, self-regulation, self-efficacy, utility value, and test anxiety. Furthermore, this chapter presents the results of the correlation analysis conducted to examine the relationship between peer tutoring experience and academic motivation.

**3.1 Summary Level of Peer Tutoring Experience across Five Dimensions**

Table 3 presents the overall summary of peer tutoring experience among student tutors in mathematics across five key dimensions: academic, social, professional, personal, and psychological.

**Table 3.** **Summary on the Level of Peer Tutoring Experience across Five Dimensions**

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Mean** | **SD** | **Descriptive Equivalent** |
| The Academic Dimension | 4.14 | 0.50 | High |
| The Social Dimension | 4.08 | 0.54 | High |
| The Professional Dimension | 3.90 | 0.56 | High |
| The Personal Dimension | 4.07 | 0.64 | High |
| The Psychological Dimension | 4.33 | 0.61 | Very High |
| **Peer Tutoring Experience**  | **4.10** | **0.49** | **High** |

Across the five measured dimensions: academic, social, professional, personal, and psychological, the peer-tutoring program generated uniformly positive outcomes, with all sectional means rated between “High” to “Very High”.

The academic dimension posted an overall mean of 4.14 with a standard deviation of 0.50, which indicates a high level of agreement that tutors regarded their teaching role as an academic learning opportunity rather than merely an extracurricular activity. It also suggests that peer tutoring was perceived not only as a service to others but also as a valuable avenue for reinforcing and deepening their own mathematical understanding which echoes evidence that learning by teaching deepens conceptual understanding and stimulates reflection (Oduro et al., 2022; Yoviyanti et al., 2023).

In the social dimension, the overall mean score of 4.08 with a standard deviation of 0.54, interpreted as High, indicates that the mathematics tutoring program positively contributed to the tutors’ social development. This is further supported by the formation of strong friendships and empathic dialogue which validate claims that collaborative peer work bolsters motivation and belonging (Moradi & Mardani, 2024).

In the professional dimension, the overall mean score of 3.90 and a standard deviation of 0.56, interpreted as High, suggests that the tutoring program supported the development of professional competencies among the participants. The program doubled as an avenue for workplace-relevant skills, particularly communication and time-management which aligns with findings that structured peer instruction accelerates leadership-ready competencies (Parker et al., 2023). Similar studies supported also the findings that peer tutoring can be an avenue for developing communication skills, organizational management, and productivity capabilities which are relevant in fulfilling both educational and professional roles (López-Gómez et al., 2020).

In the personal dimension, the overall mean of 4.07 and a standard deviation of 0.64, with a descriptive equivalent of High, signifies that the peer tutoring experience contributed meaningfully to their personal growth. This suggests that, beyond academic and social gains, the program also nurtured intrapersonal development. Tutors reported heightened pride, responsibility, and self-esteem, which supports studies that peer acknowledgment nurtures a positive self-concept (Mama et al., 2024).

In the psychological dimension, the overall mean score of 4.33 and a standard deviation of 0.61, interpreted as Very High, reveals that the mathematics tutoring program had a strong positive effect on the psychological outlook of the participants. Tutors thus perceived peer tutoring not only as cognitively and socially rewarding but also as an influential source of positive disposition and emotional resilience. The program emerged as the most potent catalyst, fostering happiness, patience, and perseverance, which suggests that positive affect widens attention and sustains engagement (Stanley & Schutte, 2023).

Based on the data, the program delivered a holistic developmental package: it sharpened cognitive skills, enriched interpersonal bonds, cultivated employability traits, fortified self-worth, and fostered resilient and positive emotions. These outcomes reflect the core of Experiential Learning Theory, which posits that meaningful learning occurs through active involvement and reflective practice. Peer tutoring, as an experiential activity, enables student tutors to cycle through concrete experience, reflective observation, abstract conceptualization, and active experimentation, thereby solidifying knowledge and deepening motivation. By building on these strengths, institutions can establish peer tutoring as a key strategy for promoting comprehensive mathematics learning and holistic student development.

**3.2** **Summary on the Level of Academic Motivation across Six Dimensions**

Table 4 presents the overall summary of peer tutors' academic motivation in mathematics across six dimensions: intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety. The computed overall mean of 3.92 (SD = 0.41), interpreted as High, suggests that peer tutors possess a strong and positive motivation toward their mathematics learning.

**Table 4. Summary on the Level of Academic Motivation across Six Dimensions**

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Mean** | **SD** | **Descriptive Equivalent** |
| Intrinsic Value | 3.89 | 0.66 | High |
| Attainment Value | 4.05 | 0.61 | High |
| Self-regulation | 3.99 | 0.52 | High |
| Self-efficacy | 3.46 | 0.70 | High |
| Utility Value | 4.02 | 0.65 | High |
| Test Anxiety | 4.14 | 0.64 | High |
| **Academic Motivation**  | **3.92** | **0.41** | **High** |

The highest-rated dimension was test anxiety ( = 4.14, SD = 0.64) which indicates that while tutors are motivated, they experience noticeable nervousness and concern related to mathematics assessments. It reflects that test anxiety is a prevalent issue among students, influencing their emotional well-being and potentially hindering their academic performance. While their general academic motivation is strong, as reflected in other dimensions, the emotional burden of testing can still impact their confidence and performance. Complementing this, Jamieson et al. (2021) found that students with elevated test anxiety not only scored lower on exams but also perceived academic tasks as more demanding and themselves as less equipped to handle them, which further exacerbates the anxiety-performance cycle.

Meanwhile, self-efficacy recorded the lowest mean ( = 3.46, SD = 0.70), reflecting that although the tutors generally believe in their ability to perform well, their confidence, particularly in outperforming peers or achieving very high grades, is moderate.

The results show that peer tutors are driven by both intrinsic factors, such as enjoyment of learning (Intrinsic Value: = 3.89, SD = 0.66), and extrinsic factors, such as the importance of academic achievement (Attainment Value: = 4.05 SD = 0.61) and the perceived relevance of mathematics for future careers (Utility Value: = 4.02, SD = 0.65). They also demonstrate positive learning behaviors through self-regulation ( = 3.99, SD = 0.52), which supports their sustained academic engagement.

Self-efficacy plays a pivotal role in academic success by influencing how students cope with academic challenges. High levels of self-efficacy are associated with reduced test anxiety, which in turn leads to better academic performance (Rini, 2024). In contrast, students with only moderate self-efficacy are more likely to experience heightened anxiety during exams, which can negatively affect their academic outcomes (Melnikova et al., 2020). Test anxiety itself is shaped by various factors, including individual psychological traits and the nature of the learning environment (Santi et al., 2024).

Supportive pedagogical practices that foster a positive and secure classroom atmosphere can help alleviate anxiety and enhance students’ confidence. Furthermore, structured support programs, such as counseling initiatives focused on stress reduction and confidence-building, have been shown to improve self-efficacy and reduce test-related stress (Chen, 2023).

The findings indicate that the mathematics peer tutoring program successfully nurtures high academic motivation among tutors, characterized by a strong value placed on learning, effort regulation, career relevance, and emotional investment. This aligns with Self-Determination Theory, which highlights the role of competence, autonomy, and relatedness in fostering motivation. Peer tutoring supports these needs by allowing tutors to feel capable, act with choice, and connect meaningfully with others, thereby sustaining their academic drive. However, continuous efforts to strengthen their self-belief and manage assessment-related anxiety would further enhance their academic growth and resilience.

**3.3 Relationship Between Peer Tutoring Experience and Academic Motivation**

The study examined the relationship between peer tutoring experience and academic motivation of peer tutors in mathematics, considering intrinsic value, attainment value, self-regulation, self-efficacy, utility value, and test anxiety. Pearson correlation analysis was conducted to determine the significance and strength of these relationships.

Table 5 presents the result of the Pearson correlation analysis conducted to examine the relationship between peer tutoring experience and academic motivation among Junior High School mathematics peer tutors.

**Table 5. Relationship Between Peer Tutoring Experience and Academic Motivation**

|  |  |  |
| --- | --- | --- |
|   | **Academic Motivation** | **Remarks** |
| The Academic Dimension | Pearson's r | 0.668 | Significant |
| p-value | <.001 |
| The Social Dimension | Pearson's r | 0.522 | Significant |
| p-value | .001 |   |
| The Professional Dimension | Pearson's r | 0.569 | Significant |
| p-value | <.001 |  |
| The Personal Dimension | Pearson's r | 0.626 | Significant |
| p-value | <.001 |  |
| The Psychological Dimension | Pearson's r | 0.545 | Significant |
| p-value | <.001 |  |
| **Peer Tutoring Experience** | Pearson's r | 0.686 | Significant |
| p-value | <.001 |  |

Among the dimensions of peer tutoring experience, the Academic (r = 0.668, *P* < .01) and Personal (r = 0.626, *P* < .01) dimensions showed the strongest positive correlations with academic motivation which reflects substantial relationships between these aspects of tutoring and motivational levels. The Professional (r = 0.569, *P* < .01), Psychological (r = 0.545, *P* < .01), and Social (r = 0.522, *P* < .01) dimensions also demonstrated moderate but statistically significant correlations with academic motivation.

In addition, an overall correlation revealed a Pearson’s r value of 0.686, which indicates a strong positive correlation between the two variables. This suggests that as peer tutoring experience increases, academic motivation also tends to increase. The *P*-value associated with this correlation is <.001, which is less than the standard alpha level of .05 which indicates that the result is statistically significant. Therefore, the null hypothesis that there is no significant relationship between peer tutoring experience and academic motivation is rejected. This significant and positive correlation implies that meaningful peer tutoring experiences are associated with higher levels of academic motivation. This supports the idea that engaging in peer tutoring fosters a sense of responsibility, self-efficacy, and purpose among student tutors, which in turn enhances their motivation to excel academically. This finding aligns with the principles of Self-Determination Theory, which posits that fulfilling the needs for competence and relatedness, both present in peer tutoring, can enhance intrinsic motivation. Supporting this, Kruse et al. (2024) found that peer-relatedness support was a meaningful predictor of intrinsic motivation in educational settings, further reinforcing the motivational value of collaborative learning experiences.

Intrinsic and extrinsic motivation both significantly influence students' academic behavior and outcomes. On one hand, intrinsic motivation, driven by personal interest and internal satisfaction, is closely linked to higher academic engagement and stronger performance over time (Merhi et al., 2025; Rochovská, 2024). In contrast, extrinsic motivation relies on external rewards such as grades or recognition. While extrinsic rewards may boost short-term engagement but are not beneficial during autonomous learning, which is crucial for long-term academic success (van Lieshout et al., 2023)

The result resonates with Experiential Learning Theory, which emphasizes learning as a process grounded in experience. Through tutoring, students not only transmit knowledge but also engage in active experimentation and reflective observation, which are two core stages in Kolb’s learning cycle. A study also showed that peer tutoring not only deepens understanding of academic content but also fosters social connection and shared responsibility, enhancing overall motivation (Jordan, 2023). Additionally, students who are motivated, whether intrinsically or extrinsically, tend to exhibit better self-regulation skills, which are essential for independent learning and academic achievement (Rochovská, 2024; Xuan, 2022).

4. summary, conclusions and recommendations

**4.1 Summary of Findings**

Descriptive statistics revealed that participants demonstrated a very high level of experience in the psychological dimension, while the other four dimensions of peer tutoring experience (academic, social, professional, and personal) were rated at high levels. Similarly, all six dimensions of academic motivation were found to be at high levels. Pearson’s correlation analysis showed a statistically significant positive relationship between overall peer tutoring experience and academic motivation. This finding led to the rejection of the null hypothesis, indicating a statistically significant relationship between peer tutoring experience and academic motivation in mathematics.

**4.2 Conclusions**

The findings revealed that participating in peer tutoring is strongly associated with higher academic motivation among Junior High School tutors. Those who reported more positive and extensive tutoring experiences also demonstrated greater motivation to learn mathematics. This suggests that teaching others not only helps tutors improve their own understanding of math but also builds their confidence, increases their interest, and gives them a stronger sense of purpose in their learning.

This positive correlation supports theoretical propositions from Self-Determination Theory and Experiential Learning Theory. When students are placed in roles that promote autonomy and competence, such as serving as peer tutors, they tend to develop greater motivation and deeper academic engagement.

**4.3 Recommendations**

Based on the study’s findings, the following recommendations aim to strengthen mathematics peer tutoring programs:

1. Peer tutoring should be recognized and supported as a strategic intervention not only for struggling learners but also for academically proficient students. It serves to strengthen both learning and motivation for the tutor. The results advocate for the formal integration of peer tutoring in mathematics programs, supported by structured training, protected scheduling, and recognition systems to fully maximize its motivational benefits.
2. Educational planners and school division leaders should institutionalize peer tutoring through formal policies, standardized schedules, and integration into the School Improvement Plan. This ensures alignment with performance targets and access to funding. Collaborating with universities can provide external feedback while offering practicum experience to education majors.
3. Administrators are encouraged to provide necessary materials such as whiteboards, manipulatives, and digital tools. A recognition system using certificates or transcript notations can help sustain tutors' motivation.
4. Teachers and implementers should receive training to help tutors explain concepts clearly and manage challenges. Teachers should also monitor sessions and give feedback.
5. Parents and students must be involved. Parents should support participation and recognize the developmental benefits of tutoring. Tutees should attend orientation sessions and be monitored through simple quizzes and feedback.
6. For quality assurance, schools should use data dashboards that combine academic results, feedback, and observations to guide improvements.
7. Future researchers are advised to use longitudinal or quasi-experimental designs, include diverse samples, and use objective indicators like GPA and outputs. Advanced analysis can clarify how academic, social, and psychological factors influence motivation.

Consent

Informed consent was obtained from all participants, and for those under 18, both informed assent and parental consent were required. Participants were fully briefed on the study’s goals, procedures, and potential risks and benefits, and were assured of their right to voluntary participation and unconditional withdrawal at any point. Sessions were scheduled flexibly to accommodate students’ academic demands, and all activities were conducted in a supervised and supportive environment to minimize psychological or logistical risks.

Ethical approval

This study strictly adhered to established ethical research protocols to safeguard the rights, dignity, and well-being of all participants. Ethical clearance was obtained from the Davao Oriental State University Review Ethics Board prior to data collection. Administrative permissions were secured from the Dean of the Graduate School, the Schools Division Superintendent, and school principals to ensure institutional compliance with ethical standards governing research involving minors and educational institutions. The study was guided by principles of beneficence, respect for persons, and justice, and aimed to contribute significant social value by examining how peer tutoring enhances students’ academic motivation. Data confidentiality was rigorously upheld in line with the Data Privacy Act of 2012, using anonymized codes and secure data storage accessible only to the research team.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

References

1. Adhikari, R., & Timsina, T. P. (2024). An Educational Study Focused on the Application of Mixed Method Approach as a Research Method. OCEM Journal of Management, Technology & Social Sciences, 3(1), 94–109. https://doi.org/10.3126/ocemjmtss.v3i1.62229
2. Al Kharusi, D. (2016). What Positive Impacts Does Peer Tutoring Have Upon The Peer Tutors at SQU? The International Institute for Science, Technology and Education. https://files.eric.ed.gov/fulltext/EJ1115801.pdf
3. Alegre, F., Moliner, L., Maroto, A., & Lorenzo-Valentin, G. (2019). Peer tutoring and mathematics in secondary education: literature review, effect sizes, moderators, and implications for practice. Heliyon, 5(9), e02491. https://doi.org/10.1016/j.heliyon.2019.e02491
4. Alegre, F., Moliner, L., Maroto, A., & Lorenzo-Valentin, G. (2020). Academic Achievement and Peer Tutoring in Mathematics: A Comparison Between Primary and Secondary Education. Sage Open, 10(2). https://doi.org/10.1177/2158244020929295
5. Atamosa, M. S., & Dioso, E. D. (2024). Peer Tutoring Approach and Academic Performance of Pupils: An Experimental Study. International Journal of Innovative Science and Research Technology (IJISRT), 2085–2107. https://doi.org/10.38124/ijisrt/IJISRT24JUL1085
6. Bercasio, R. R., & Cabrillas, Z. (2019). EFFECTIVENESS OF PEER MENTORING IN ENHANCING THE MATHEMATICAL PROBLEM SOLVING SKILLS OF COLLEGE STUDENTS IN BICOL UNIVERSITY. Bicol University Research and Development Journal. https://doi.org/10.47789/burdj.mbtcbbgs.20172001.6
7. Biju, S. M. (2019). Benefits of Working in Pairs in Problem Solving and Algorithms - Action Research. ATHENS JOURNAL OF EDUCATION, 6(3), 223–236. https://doi.org/10.30958/aje.6-3-4
8. Boadu, S. K., Arthur, Y. D., & Bonyah, E. (2023). Mediation and moderation effects of motivation and teaching quality on the relationship between peer tutoring and mathematics achievement. Journal of Mathematics and Science Teacher, 3(2), em039. https://doi.org/10.29333/mathsciteacher/13166
9. Bongga, R. O. (2024). SOCRATIC METHOD OF TUTORING: AN INNOVATION FOR BETTER STUDENTS’ NUMERACY SKILLS. EPRA International Journal of Multidisciplinary Research (IJMR), 243–250. https://doi.org/10.36713/epra16836
10. Briggs, S. (2019). Ethical research in the secondary school classroom. Teachers and Curriculum, 19(1), 61–66. https://doi.org/10.15663/tandc.v19i1.332
11. Camacho, A. G. (2022). The Mediating Effect of Academic Motivation on the Relationship between Metacognitive Skills, Students Attitudes and Beliefs toward Mathematics. International Journal of Research and Innovation in Social Science, 06(07), 296–308. https://doi.org/10.47772/IJRISS.2022.6721
12. Chen, Y. H. (2023). Test anxiety, self-efficacy and academic performance among senior three students: Basis for a psychological counseling program. International Journal of Research Studies in Psychology, 9(1). https://doi.org/10.5861/ijrsp.2023.2002
13. Comahig, J. C., & Abuzo, E. P. (2024). THE MEDIATING EFFECT OF ATTITUDES TOWARDS MATHEMATICS ON THE RELATIONSHIP BETWEEN ACADEMIC SELF-EFFICACY AND MOTIVATION TO LEARN MATHEMATICS. EPRA International Journal of Multidisciplinary Research (IJMR), 387–393. https://doi.org/10.36713/epra16217
14. Dąbrowska, I., & Dąbrowska, M. (2022). Tutoring in academic settings: From one-to-one experience to peer-tutoring. Rozprawy Społeczne, 16(1), 1–19. https://doi.org/10.29316/rs/146910
15. Elbulok-Charcape, M. M., Grandoit, E., Berman, L. M., Fogel, J., Fink, L., & Rabin, L. (2020). Abstracts of recent articles published in Psychology Teaching Review. Psychology Learning & Teaching, 19(1), 116–120. https://doi.org/10.1177/1475725719886399
16. Escobar, J. C. M., Roldán, P. A. C., Vargas, L. M. U., Bustamante, Á. M. P., & Ordoñez, M. E. Y. A. (2025). La Autorregulación del Aprendizaje en el Contexto Educativo Colombiano: Revisión de la Literatura Científica, 2019 - 2023. Ciencia Latina Revista Científica Multidisciplinar, 8(6), 7270–7287. https://doi.org/10.37811/cl\_rcm.v8i6.15419
17. Finlay, S. (2019). Academic and Personal Impact of Peer Tutoring on the Peer Tutor. 234–249. https://doi.org/10.4018/978-1-5225-5846-0.ch014
18. Fiorella, L., Yoon, S. Y., Atit, K., Power, J. R., Panther, G., Sorby, S., Uttal, D. H., & Veurink, N. (2021). Validation of the Mathematics Motivation Questionnaire (MMQ) for secondary school students. International Journal of STEM Education, 8(1), 52. https://doi.org/10.1186/s40594-021-00307-x
19. Fong, C. J., Patall, E. A., Snyder, K. E., Hoff, M. A., Jones, S. J., & Zuniga-Ortega, R. E. (2023). Academic underachievement and its motivational and self-regulated learning correlates: A meta-analytic review of 80 years of research. Educational Research Review, 41, 100566. https://doi.org/10.1016/j.edurev.2023.100566
20. Guay, F. (2021). Applying Self-Determination Theory to Education: Regulations Types, Psychological Needs, and Autonomy Supporting Behaviors. Canadian Journal of School Psychology, 37(1), 75–92. https://doi.org/10.1177/08295735211055355
21. Han, J., Cho, H., Lee, S., Chang, A., Park, H., & Lim, Y. (2024). Early learning, tutoring, and STEM motivation: Impact on Korean students’ mathematics achievement. Eurasia Journal of Mathematics, Science and Technology Education, 20(6), em2460. https://doi.org/10.29333/ejmste/14659
22. Hidayat, R., Nasir, N., Fadzli, S. A. M., Rusli, N. S., Kamaruzzaman, N. N., Sheng, V. Y. Z., Mohammad, N. H. H., & Shukeri, A. S. (2023). Peer Tutoring Learning Strategies in Mathematics Subjects: Systematic Literature Review. European Journal of Educational Research, volume-12-2023(volume-12-issue-3-july-2023), 1407–1423. https://doi.org/10.12973/eu-jer.12.3.1409
23. Ikart, E. M. (2019). Survey Questionnaire Survey Pretesting Method: An Evaluation of Survey Questionnaire via Expert Reviews Technique. Asian Journal of Social Science Studies, 4(2), 1. https://doi.org/10.20849/ajsss.v4i2.565
24. Jamieson, J. P., Black, A. E., Pelaia, L. E., & Reis, H. T. (2021). The impact of mathematics anxiety on stress appraisals, neuroendocrine responses, and academic performance in a community college sample. Journal of Educational Psychology, 113(6), 1164–1176. https://doi.org/10.1037/edu0000636
25. Jordan, M. (2023). The power of connection: Self-care strategies of social wellbeing. Journal of Interprofessional Education & Practice, 31, 100586. https://doi.org/10.1016/j.xjep.2022.100586
26. Kagerbauer, M., & Magdolen, M. (2024). Workshop synthesis: Measuring attitudes and perceptions in large scale (quantitative) surveys. Transportation Research Procedia, 76, 617–623. https://doi.org/10.1016/j.trpro.2023.12.082
27. Kolb, D. A. (1984). Experiential Learning: Experience As The Source Of Learning And Development Learning Sustainability View project How You Learn Is How You Live View project. http://www.learningfromexperience.com/images/uploads/process-of-experiential-learning.pdf!
28. Kong, Y. (2021). The Role of Experiential Learning on Students’ Motivation and Classroom Engagement. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.771272
29. Kruse, F., Büchel, S., & Brühwiler, C. (2024). Longitudinal effects of basic psychological need support on the development of intrinsic motivation and perceived competence in physical education. A multilevel study. Frontiers in Psychology, 15. https://doi.org/10.3389/fpsyg.2024.1393966
30. Longjohn, D., & Kenneth, O. (2022). Effect of Peer Tutoring on Senior Secondary School Students’ Academic Performance in Mathematics in Ahoada East Local Government Area of Rivers State. . Saudi Journal of Humanities and Social Sciences.
31. López-Gómez, E., Leví-Orta, G., Medina Rivilla, A., & Ramos-Méndez, E. (2020). Dimensions of university tutoring: a psychometric study. Journal of Further and Higher Education, 44(5), 609–627. https://doi.org/10.1080/0309877X.2019.1571174
32. Mackenzie, L. (2021). Low attendance on a peer tutoring scheme for English language learners. ELT Journal, 76(4), 487–496. https://doi.org/10.1093/elt/ccab059
33. Mama, A., Owusu, G., & Wiysonge, C. S. (2024). Assessing the Effectiveness of Peer Tutoring in Improving STEM Education Outcomes. International Journal of Educational Research, 1(1), 01–07. https://doi.org/10.62951/ijer.v1i1.11
34. Melnikova, Y., Long, V., & Stocker, R. S. (2020). Investigating self-efficacy, test anxiety, and performance in college Algebra. Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 1395–1398. https://doi.org/10.51272/pmena.42.2020-216
35. Merhi, R., Sánchez-Elvira-Paniagua, Á., Palací, F. J., & Salanova, M. (2025). ¿Estudio lo que quiero o lo que debo? Revista de Investigación Educativa, 43. https://doi.org/10.6018/rie.594561
36. Moradi, S., & Mardani, F. (2024). The Impact of Peer Attachment on Academic Motivation: A Quantitative Analysis. KMAN Counseling and Psychology Nexus, 2(1), 4–9. https://doi.org/10.61838/kman.psychnexus.1.2.2
37. Moumoulidou, M., Karadimitriou, K., & Pliogou, V. (2020). A Case Study of Peer Tutoring Implementation at University: Investigating the Students’ Difficulties that Were Faced with the Method and the Tutors’ Difficulties in Applying It\*. International Journal of Psychology and Educational Studies, 7(4), 1–13. https://doi.org/10.17220/ijpes.2020.04.001
38. Oduro, I. K., Akuta, A. B., & Kuranchie, A. (2022). Tutors’ Use of Reflective Practice to Promote Teaching and Learning. Creative Education, 13(07), 2308–2320. https://doi.org/10.4236/ce.2022.137147
39. Ota, A. (2019). Investigating Transformation in Tutoring Sessions. Relay Journal, 385–393. https://doi.org/10.37237/relay/020212
40. Parker, E., Tariq, A., & Smith, A. (2023). Exploring the Effectiveness of Peer Tutoring in English Language Learning Among Young Learners. Research Studies in English Language Teaching and Learning, 1(2). https://doi.org/10.62583/rseltl.v1i2.13
41. Putranto, S., Marsigit, M., & Ratnasari, G. I. (2022). Peer Tutoring with Realistic Mathematics Education in Inclusive Class to Improve Problem-Solving Skills. Journal of Education Research and Evaluation, 6(2), 307–315. https://doi.org/10.23887/jere.v6i2.43651
42. Raboca, H. M., & Cărbunărean, F. (2024). Faculty Support as Part of Faculty Strategy on the Academic Motivation of the Working Students. Education Sciences, 14(7), 746. https://doi.org/10.3390/educsci14070746
43. Rahman, N. A. A., Razak, F. A., & Che Dzul-Kifli, S. (2020). THE EFFECT OF PEER TUTORING ON THE PROCESS OF LEARNING MATHEMATICAL PROOFS. Advances in Mathematics: Scientific Journal, 9(9), 7375–7384. https://doi.org/10.37418/amsj.9.9.84
44. Rahmi, W. (2024). Analytical Study of Experiential Learning: Experiential Learning Theory in Learning Activities. EDUKASIA: Jurnal Pendidikan Dan Pembelajaran, 5(2), 115–126. https://doi.org/10.62775/edukasia.v5i2.1113
45. Rini, H. (2024). SELF EFFICACY DENGAN KECEMASAN DALAM MENGHADAPI UJIAN NASIONAL. Cognicia, 1(1). https://doi.org/10.22219/cognicia.v1i1.1441
46. Roberts, A. K., & Spangenberg, E. D. (2020). Peer tutors’ views on their role in motivating learners to learn mathematics. Pythagoras, 41(1). https://doi.org/10.4102/pythagoras.v41i1.520
47. Rochovská, I. (2024). MOTIVATION AND SELF-REGULATION OF LEARNING IN HOMESCHOOLED STUDENTS. Problems of Education in the 21st Century, 82(5), 723–736. https://doi.org/10.33225/pec/24.82.723
48. Rodríguez, S., Estévez, I., Piñeiro, I., Valle, A., Vieites, T., & Regueiro, B. (2021). Perceived Competence and Intrinsic Motivation in Mathematics: Exploring Latent Profiles. Sustainability, 13(16), 8707. https://doi.org/10.3390/su13168707
49. Russo, J. A. (2019). PEER TUTORING IN THE ELEMENTARY CLASSROOM: PUTTING (A) THEORY INTO PRACTICE. McGill Journal of Education, 53(3). https://doi.org/10.7202/1058419ar
50. Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary Educational Psychology, 61, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860
51. Salani, E., & Sekgoma, A. (2024). The Efficacy of Peer Tutoring on Math Achievement in Supplementary Examinations for First-Year Bachelor of Primary Education Students. International Journal of Social Sciences and Humanities Invention, 11(12), 8365–8372. https://doi.org/10.18535/ijsshi/v11i12.03
52. Santi, E.-A., Gorghiu, G., & Pribeanu, C. (2024). THE RELATIONSHIP BETWEEN INTRINSIC MOTIVATION, ACADEMIC SELF-EFFICACY, LEARNING ENGAGEMENT, AND TEST ANXIETY, AS PERCEIVED BY UNIVERSITY STUDENTS. Problems of Education in the 21st Century, 82(6), 892–903. https://doi.org/10.33225/pec/24.82.892
53. Shirvani, E., Mirsolymani, Z., Parvin, H., & Mosavi, S. (2024). Strategies for Enhancing Academic Motivation: Insights from Successful Students. KMAN Counseling and Psychology Nexus, 2(1), 42–48. https://doi.org/10.61838/kman.psychnexus.2.1.7
54. Singh, Rajaputra. U. (2023). A Case Study on the Impact of Peer Tutoring in the Education of Freshmen Engineering. Journal of Engineering Education Transformations, 36(S2), 441–445. https://doi.org/10.16920/jeet/2023/v36is2/23067
55. Stanley, P. J., & Schutte, N. S. (2023). Merging the Self-Determination Theory and the Broaden and Build Theory through the nexus of positive affect: A macro theory of positive functioning. New Ideas in Psychology, 68, 100979. https://doi.org/10.1016/j.newideapsych.2022.100979
56. Tran, L. T., & Nguyen, T. S. S. (2021). MOTIVATION AND MATHEMATICS ACHIEVEMENT: A VIETNAMESE CASE STUDY. Journal on Mathematics Education, 12(3), 449–468. https://doi.org/10.22342/jme.12.3.14274.449-468
57. Ullah, I., & Kaleem, M. (2020). Effectiveness of Peer Tutoring on The Academic Achievements of Tutors and Tutees With Respect to Knowledge, Comprehension and Application Levels of Cognitive Domain. FWU Journal of Social Sciences, 14(4), 68–79. https://doi.org/10.51709/FW12726
58. van Lieshout, L., Colizoli, O., Holman, T., Kühnert, F., & Bekkering, H. (2023). Rewards can be costly: extrinsic rewards are not beneficial during autonomous learning. https://doi.org/10.31234/osf.io/2ga8j
59. Ventura-León, J., & Peña-Calero, B. N. (2020). El mundo no debería girar alrededor del alfa de Cronbach ≥ ,70. Adicciones, 33(4), 369. https://doi.org/10.20882/adicciones.1576
60. Wang, Y., & Sperling, R. A. (2020). Characteristics of Effective Self-Regulated Learning Interventions in Mathematics Classrooms: A Systematic Review. Frontiers in Education, 5. https://doi.org/10.3389/feduc.2020.00058
61. Ximenes, E. N., Suarjana, I. M., & Wirabrata, D. G. F. (2023). Peer-Tutor Assisted Problem-Based Learning Model on Mathematics Critical Thinking. MIMBAR PGSD Undiksha, 11(2), 315–323. https://doi.org/10.23887/jjpgsd.v11i2.61390
62. Xuan, B. (2022). An overview of the impacts of intrinsic and extrinsic motivation on students’ self-study. International Journal of Advanced Scientific Research and Management, 7(5), 24–28. https://doi.org/10.36282/IJASRM/7.5.2022.1861
63. Yaman, B. B. (2017). A multiple case study: What happens in peer tutoring of calculus studies? International Journal of Education in Mathematics, Science and Technology, 1–1. https://doi.org/10.18404/ijemst.328336
64. Yoviyanti, R., Wahyudi, Suhendar, U., & Zuraidah, Z. (2023). The Effectiveness of Peer Tutoring on Students’ Understanding of Mathematical Concepts. Jurnal Pedagogi Dan Pembelajaran, 6(3), 350–358. https://doi.org/10.23887/jp2.v6i3.65191