Optimizing Mathematical Accomplishment: Relationship with Motivation, Peer-Assisted Learning, Pedagogical Quality and Student Interest

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ABSTRACT

Mathematics is a fundamental subject for all university students, irrespective of their field of study. This subject is essential for the cultivation of fundamental skills in a variety of fields, such as mathematical reasoning, critical thinking, and problem-solving. Nevertheless, the mathematical achievements of Malaysian university students have consistently been a source of concern. It is imperative to examine the factors that contribute to this issue in order to resolve it. The objective of this research is to investigate the factors that facilitate the optimisation of mathematical achievement among university students. The investigation specifically investigates the correlations between mathematical achievement and four critical variables: student interest, motivation, peer-assisted learning, and pedagogical quality. In order to accomplish this objective, quantitative data will be collected from a representative sample of university students who are enrolled in mathematics courses. The questionnaires will evaluate student interest, pedagogical quality, motivation, peer-assisted learning, and mathematical accomplishment. The data were collected through a random distribution of questionnaires to students at the UiTM Sabah branch who were taking a mathematics course. The data were organised and entered into SPSS for analysis. Descriptive and inferential statistics were implemented. The results suggest that the achievement of students in mathematics was substantially influenced by their motivation, peer-assisted learning, pedagogical quality, and interest. Additionally, this research contributes to advancing effective instructional techniques and interventions that improve students' mathematical performance. Furthermore, this investigation enhances the body of knowledge regarding the influence of motivation, peer-assisted learning, pedagogical quality, and student interest on the optimisation of mathematical achievement, which will have substantial implications for educational policy and practice.

Keywords: Mathematical Achievement, Pedagogical Quality, Peer-Assisted Learning

BACKGROUND

The average mathematics score in Malaysia was 440 points, as per the most recent statistics from the Programme for International Student Assessment (PISA) in 2018, which assesses the knowledge and abilities of 15-year-old students in reading, mathematics, and science. This score was slightly lower than the average of 489 points for nations that are members of the Organisation for Economic Co-operation and Development (OECD). The PISA report also included data about the proportion of children who achieved competence levels in mathematics. Compared to the OECD average of 11.2%, 9.4% of Malaysian pupils demonstrated proficiency in mathematics at Level 5 or higher. In addition, greater than the OECD average of 21.8%, 31.4% of pupils in Malaysia did not meet the required competency level in mathematics.

According to a 2018 World Bank research, mathematics competency among Malaysian pupils is below the norm for upper-middle-income nations, suggesting that certain Malaysian university students may struggle with the

subject. Notably, factors such as teacher quality, curriculum, and socioeconomic background may all influence kids' mathematical performance.

Mathematical accomplishments are also noteworthy, as STEM (science, technology, engineering, and mathematics) education becomes increasingly significant in Malaysia and the global community. Mathematics is a foundational subject in STEM disciplines, and the future success of university students in their academic and professional endeavours can be significantly impacted by their improved mathematical performance.

The investigation may aim to address inquiries such as: What inspires university students to excel in mathematics? What is the impact of peer-assisted learning on their mathematical proficiency? What role does pedagogical quality play in improving their performance? Additionally, what is the significance of student interest in the pursuit of academic success in mathematics?

The results of this investigation indicate that students' attitudes towards mathematics were unfavourable, despite their enthusiasm for the subject. Furthermore, there is a direct, marginally significant positive correlation between the mathematical achievement of students and their perceptions of mathematics. In the same vein, the success of mathematics was predicted by the perception and interest of students. Furthermore, the mathematical proficiency of children is significantly correlated with their interest in mathematics, which is relatively favourable. Finally, a statistically significant weak positive direct association exists between the perception of mathematics and the interest of students in mathematics (Salifu and Bakari, 2022).

Concurrently, Arthur et al. (2022) discovered that mathematics learning motivation and mathematics instruction quality had substantial beneficial effects on mathematics performance among tertiary students. Nevertheless, mathematical achievement was not directly influenced by peer-assisted mathematics learning. The motivation of students to acquire mathematics was the primary factor that mediated the link. The effects of mathematics learning motivation and mathematics instruction quality on mathematics performance were also partially mediated by students' interest in mathematics.

A favourable correlation was observed between the effects of student self-efficacy and student perception on mathematical success through path analysis. Excellent mathematics achievement was observed in children who possessed strong mathematics self-efficacy and positive perceptions of mathematics. The same investigation also demonstrated that teacher-student connections do not have a statistically significant impact on mathematical success. Students' success in mathematics was significantly predicted by their perception of mathematics and their level of self-efficacy (Appiah et al., 2022).

Moreover, the study will employ an interdisciplinary approach by exploring the relationships between multiple variables. This could involve conducting a literature review to identify previous research on the topic, administering surveys to university students to gather data on their motivation, interest, and experiences with peer-assisted learning, and possibly conducting classroom observations to assess the quality of teaching. Therefore, the study aims to contribute to the understanding of how to optimize mathematical achievement among university students in Malaysia, which could have significant implications for improving education outcomes in the country.

INTRODUCTION

Malaysia is one of the ten countries in coalition with the Association of Southeast Asian Nations (ASEAN). According to Maamin, Maat & Iksan (2021), in the Organisation for Economic Co-operation and Development (OECD)’s Programme for International Student Assessment (PISA) 2018, there are six ASEAN countries that have participated as Singapore, Malaysia, Brunei, Thailand, Indonesia, and the Philippines. Over the years, Malaysia has joined PISA and in 2018, Malaysia managed to score 440 which is below the OECD average score of 489. Only Singapore outperformed the OECD average score according to the ASEAN nations that took part in PISA 2018. Based on the PISA 2018 result, the developing countries in ASEAN are less encouraging in Mathematics, despite today’s development of teaching and learning methodologies.

Besides PISA, Malaysia also participates in TIMSS (Trends International Mathematics and Science Study). According to Yusof et. al (2019), during TIMSS 2015, Malaysian students show improvement with 465 points compared to 440 points in 2011. Even with this impressive improvement, Malaysia was left behind by Singapore who won first place with 621 points. It means that our country's educational system has issues in various areas, particularly mathematics education. Mathematics is a compulsory subject for all Malaysian primary and secondary schools. While for tertiary-level entry, students must have a solid foundation in mathematics to produce high-quality graduates (Davadas & Lay, 2017).

Mathematics has a role in developing students' knowledge and skills to enable them to handle day-to-day challenges, pursue higher education, and function as a potent labor force (Maamin, Maat & Iksan, 2021). To advance in their academics and for their future, students need to perform well in maths. For a nation to generate a workforce that can contribute to science and technology, high mathematics achievement is required. According to Okereke (2006), there is no area of science and technology that is exempt from the application of mathematics due to its multifaceted and diverse function in these fields.

The objective of this investigation is to determine whether student motivation, peer-assisted learning, pedagogical quality, and interest in mathematics have any substantial effects on mathematical achievement. The students' inadequate mathematics performance has elicited widespread apprehension. The primary objective of this investigation is to examine the mathematical achievements of selected university students at the Kota Kinabalu branch of Universiti Teknologi MARA in relation to a variety of contributing factors, including student motivation, peer-assisted learning, pedagogical quality, and interest in mathematics. The objective of this investigation is to investigate the impact of these contributing factors on the mathematical proficiency of students. The objective of this investigation was to investigate the influence of student motivation, peer-assisted learning, pedagogical quality, and interest in mathematics on their mathematical achievement. The subsequent research objectives were established by the investigation:

1. To investigate the impact of students' motivation on their mathematical achievement.
2. To ascertain the impact of the peer-assisted learning relationship on mathematical achievement.
3. To ascertain the influence of the pedagogical quality relationship on mathematical achievement.
4. To investigate the impact of student interest on mathematical achievement.

The problem under investigation was resolved by employing the following research questions:

1. What is the impact of students' motivation on their mathematical achievement?
2. What is the impact of the peer-assisted learning relationship on mathematical achievement?
3. What is the influence of the pedagogical quality relationship on mathematical achievement?
4. What is the impact of students' interest on their mathematical achievement?

The following hypotheses were evaluated in order to address the three research concerns of the study:

H1: The impact of students' motivation on their mathematical achievement.

H2: The impact of the peer-assisted learning relationship on mathematical achievement.

H3: The influence of the pedagogical quality relationship on mathematical achievement.

H4: The impact of students' interest on their mathematical achievement.

Significance Of the Study

This research aims to uncover characteristics that may influence the mathematics achievement of students at Universiti Teknologi MARA, Kota Kinabalu branch. The study's findings will assist students in recognising their abilities by demonstrating their level of desire while solving mathematical problems. The study aims to provide mathematics instructors with an effective strategy to educating students who lack interest in mathematics, resulting in improved academic performance in the subject. The study's findings will provide stakeholders in mathematics education with the necessary guidelines for designing the mathematics curriculum. Ultimately, this study will provide researchers with valuable guidance for future investigations on students' mathematical accomplishments.

Conceptual Framework

Numerous research has been conducted over the past few decades to discover the elements that impact mathematics success across various demographic groups. Mathematical accomplishment is impacted by several interdependent and mutually influential elements, including as the student's motivation, peer-assisted learning, pedagogical quality and interest in mathematics, according to a number of studies. Again, some of the predictive factors are quite complicated, therefore it is crucial to break them down into sub-variables and determine the relationship between each sub-variable and mathematical accomplishment.

Student's Motivation

Motivation is understood as the process that aims to achieve a goal (Cook and Artino, 2019). There is no secret that students' ability to achieve a better grade in mathematics is driven by students' motivation. We see that students who are lacking in basic knowledge and motivation perform poorly in mathematics problem solving. Hence, lack of motivation is a hindrance to learn the subject.

Attitude is related to belief and motivation. Thus, when students like to learn and do exercises in mathematics will be a tendency to get a higher mark in mathematics that will be their motivation and belief in mathematics (Ilias and Basir, 2023). A positive attitude in mathematics will lead students to be high achievement. Similarly, a research study state that students who like mathematics, tend to have good marks in mathematics examination (Khine et al., 2015).

Aspects of student motivation and their learning behaviour are also related to students 'interest and curiosity to learn. The higher the interest toward mathematics, the higher their motivation and attitude towards mathematics. Therefore, students with high motivation to learn and with good learning behaviour tend to achieve the required competency standards (Tokan & Imakulata, 2019). Consequently, it is vital to design programs or come up with initiatives to increase students' motivation to learn mathematics. For instance, developing effective teaching material such as game-based learning would be able to increase student learning motivation.

Peer-Assisted Learning

Peers have a crucial role in facilitating pupils' acquisition of mathematical knowledge. Peer-assisted learning is an educational approach where students from various classes, who may be studying different subjects within the same department, collaborate to help each other learn (Elshami et al., 2020). Santhanalakshmi and Naomi (2021) define peer-assisted learning as a well-organized programme where peers tutor one other, which has shown to be an efficient approach for education.

Arthur et al. (2022) discovered that peer-assisted learning had a notable and beneficial impact on students' enthusiasm for mathematics. Cultivating students' interest is crucial, since it enhances their enjoyment of studying mathematics. Peer-assisted learning significantly influenced students' perspective of mathematics.

Peer-assisted learning offers students a framework to enhance their academic achievement and develop their quantitative reasoning skills. Peer-assisted learning is a method that helps students who struggle with learning by providing extra support and assistance with the content they are studying. This support goes beyond what their instructor has already taught them. Moreover, peer-assisted learning not only enhances students' motivation

to study but also helps the process of deep learning, as shown by Elshami et al. (2020). Peer-assisted learning is a very advantageous method that may be used to increase students' learning effectiveness and perhaps raise their mathematical achievement.

Pedagogical quality

The quality of teaching is crucial in improving students' learning and achievements (Wallace et al., 2016). High-quality teaching in higher education is often characterised as teaching that promotes students' profound attitude to learning. Students that use a deep approach to learning prioritise the analysis and comprehension of material by establishing connections between concepts and using evidence (Postareff et al., 2018). Consequently, in order to enhance the teaching proficiency of university lecturers, it is essential for higher-education institutions to provide professional development programmes. These programmes need to be regularly evaluated and enhanced to align with the present requirements and preferences (Ambussaidi and Yang, 2019).

Teaching quality is represented by the combination of teacher attributes (such as professional credentials, experience, place of residence, and in-service training) and behaviours (such as teaching practices, attitudes, and topic knowledge) (R. Singh and S. Sarkar, 2015). All of these elements have an influence on the acquisition of knowledge by students. Teachers' management of class learning and interaction has a substantial impact on student motivation and engagement, as stated by León et al. (2018).

In addition, some elements have been found that have a substantial influence on the quality of teaching in higher education institutions (Mamites et al., 2022). The elements include several aspects such as the instructors' personality qualities, psychological traits, self-efficacy, teaching motivation, teaching experience, professional development, student composition, student feedback, institutional culture, and institutional resources. These pedagogical quality indicators may be manipulated via policy to enhance the quality of lecturers' teaching and the academic performance of students, particularly in mathematical disciplines.

Student's Interest

Interest is a main psychological in our mind that can control everything that happens in our life. If students enjoy mathematics class, they will be comfortable in learning mathematics, and they can answer any question without any anxiety or fear. When students apply values in any subject that they learn, the subject will be easy to understand and learn because values will determine the students' interest in a subject such as mathematics that they find hard to understand. Values of mathematics that students need to apply are confidence, interest, and improvement (Ilias and Basir, 2023).

Interest defines as somebody's passion and spirit that an individual desires and essential requirement towards learning. In mathematics learning, when someone show a high interest in mathematics, it would be easier for them absorb knowledge, which leads to strong motivation to deal with a lot of tasks such as assignments and mathematics examinations. Then, they will be creating a lot of curiosity towards mathematics and participate actively if they feel interested in it (Azmidar et al., 2017).

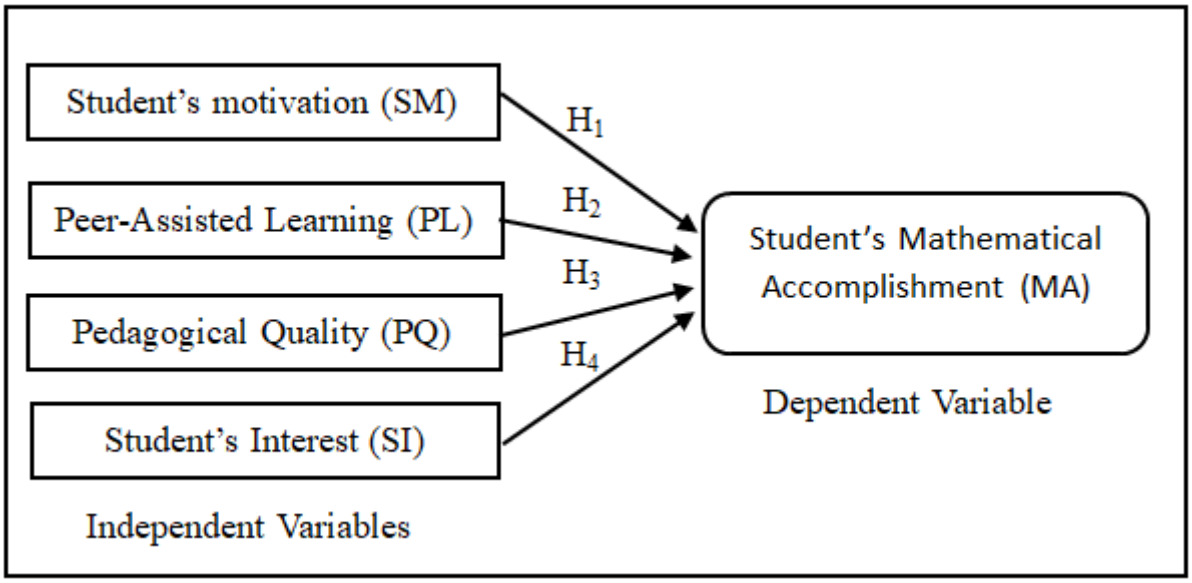
Students who demonstrate a strong interest in mathematics are more likely to excel in their academic pursuits. Mathematics is more likely to present difficulties for students who demonstrate a lack of interest in the subject (Meke et al., 2019). Since interest serves as a driving force for individual to learn, lecturers must instil a sustainable interest when they impart knowledge to students in classroom.

Research Theoretical Model Construction

A variety of variables, such as student motivation, peer-assisted learning, pedagogical quality, and interest, have a significant impact on mathematics accomplishment, as is extensively documented in the literature. Based on the reviewed research and some theoretical justifications, we hypothesise that students' mathematics achievement is influenced by at least the following constructs: student motivation on the subject, student peer-assisted learning on mathematics, pedagogical quality on the subject, and student passion for mathematics. Based

on our literature-derived conclusion and some theoretical justifications with empirical data, we provide our conceptual framework to illustrate the ideas or variables in our study and their interrelationships.

Figure 1 The conceptual framework of the interaction between the variables that impact mathematics accomplishment.



METHODOLOGY

In order to obtain the least biassed data and provide the most generalised method, this study investigated UiTM Sabah branch students who participated in a mathematics course during the semester of October 2022-February 2023. The analytical unit was conducted at the individual level using a probability sampling approach based on simple random sampling (Siraj, 2021). SPSS Version 22 is utilised to analyse the data set in order to verify the hypothesised dependent and independent variables, which are consistent with the research objective. The initial phase in the sampling procedure is to determine the sample size, accessible population, and overall population size. Sampling may also be classified as probability or non-probability. While non-probability sampling ensures that certain elements are not selected, probability sampling ensures that each member of the population has an equal chance of being selected as a topic. (Etikan and Babtope, 2019). The self-completed seven-part of the adapted questionnaire was conducted in English. Section A consisted of demographic questions, Section B contained four items on Mathematical Accomplishment, Section C contained five items on Student Motivation, Section D contained five items on Peer-Assisted Learning, Section E contained seven items on Pedagogical Quality, and Section F contained four items on Student Interest.

Sample Sizes and Sample Technique

Data was collected for a period of two to three weeks following the announcement of the mathematics course final exam results in February 2023 at the Faculty of Computer Science and Mathematics UiTM Kota Kinabalu Campus. The research was open to all first-semester students. The decision to participate in this investigation is entirely voluntary. Students were provided with online questionnaires through Google Forms. Before participating in the study, all subjects provided their informed consent for inclusion.

This research employed pure quantitative techniques in conjunction with a descriptive correlation survey methodology. Correlation surveys are employed to ascertain the relationship between two or more variables (Emaikwu, 2011). Therefore, this design was suitable in light of the conditions or relationships that exist among motivation, peer-assisted learning, pedagogical quality, student interest, and mathematics achievement. The study's target group consisted of students who were enrolled in a mathematics course at the Kota Kinabalu campus of Universiti Teknologi MARA. The university was selected using the purposive sampling method, and 100 students were selected using the simple random sampling technique (Salifu & Bakari, 2022). The simple

random sampling technique guaranteed that each member of the target population had an equal and independent chance of being included in the sample.

Data Collection Instrument

Research instruments were adapted from Arthur et al. (2022) and consisted of four items that reflected students' motivation (SM), five items that reflected each peer-assisted learning (PL) and pedagogy quality (PQ) respectively, seven items that reflected students' interest (SI), and four items that reflected mathematical achievement. For students to evaluate their perspectives, the items were graded on five Likert-scales: Strongly Disagree (SD) = 1, Disagree (D) = 2, Undecided (UD) = 3, Agree (SA) = 4, and Strongly Agree (A) = 5.

The data that was collected were organised and input into SPSS for analysis. Descriptive and inferential statistics were implemented. The second and third research questions were addressed using descriptive statistics (i.e., frequency distribution, percentages, means, and standard deviations), while the first and fourth research questions and the hypothesis were analysed using inferential statistics (Pearson moment correlation).

RESULTS AND DISCUSSIONS

Table 1 displays the reliability, correlation, and multiple regression analysis of the independent and dependent variables in the model, indicating that each variable yielded a significant result.

Table 1: Reliability Test

Variables	Cronbach's Alphas	No. of Items
Mathematical Accomplishment	.851	4
Student Motivation	.838	5
Peer-Assisted Learning	.943	5
Pedagogical Quality	.962	7
Student's Interest	.937	4

The four independent and dependent variables are illustrated in the Table 2. The Cronbach's alpha of Student's Interest is 0.937, which indicates that the reliability measure is both acceptable and satisfactory (Sekaran, 2003). Pedagogical Quality and Peer-Assisted Learning, on the other hand, demonstrated 0.962 and 0.943, respectively, suggesting that the reliability test is acceptable due to the exceptional alpha value. Additionally, the values of Student Motivation and Mathematical Accomplishment were 0.838 and 8.51, respectively, which were also deemed satisfactory.

Table 2: Correlations

Variables	Mathematical Accomplishment	Student Motivation	Peer-Assisted Learning	Pedagogical Quality	Student's Interest
Mathematical Accomplishment	1	.810** 0.000	.549** 0.000	.727** 0.000	.688** 0.000
Student Motivation		1	.588** 0.000	.694** 0.000	.810** 0.000

Peer-Assisted Learning			.1	.658** 0.000	.485** 0.000
Pedagogical Quality				1	.528** 0.000
Student's Interest					1

The Pearson Correlation Coefficient was employed to ascertain the relationship between independent variables and dependent variables. A p-value of less than 0.05 was regarded as significant. The table above demonstrates that all independent variables have a positive correlation with mathematical accomplishment. The following independent variables were significant: student motivation ($r = 0.810$, $p < 0.1$), peer assistant learning ($r = 0.549$, $p < 0.1$), pedagogical quality ($r = 0.727$, $p < 0.1$), and student interest ($r = 0.688$, $p < 0.1$). These variables supported H1, H2, H3, and H4.

Table 3: Multiple Regression Analysis

Unstandardised β Coefficient	β	Sig.
Student Motivation	0.493	0.00
Peer-Assisted Learning	-0.200	0.754
Pedagogical Quality	0.342	0.00
Student's Interest	0.124	0.05
Coefficient of Determination	Model 1	
R	0.847	
R^2	0.717	
Adjusted R^2	0.708	

The findings indicate that the coefficient of determination (R square) was 0.717 and the corrected R square was 0.708. Therefore, the Mathematical Accomplishment was supported by 70.8 different variations of the independent variable, which included student engagement, pedagogical quality, peer assistant learning, and student motivation. The β values demonstrated that the factors had a significant and beneficial impact. Student Motivation had the most effect ($\beta = 0.493$, $p < 0.05$), followed by Pedagogical Quality ($\beta = 0.342$, $p < 0.05$), and student interest ($\beta = 0.124$, $p < 0.05$). Regrettably, Peer Assistant Learning yielded negative values and unsupported variables, which were statistically significant at $p < 0.05$. Specifically, the coefficient β was -0.200, with a p-value less than 0.05.

The research examined the correlation between Mathematical Accomplishment and a limited set of 3 independent factors. The research aimed to establish the correlation between independent and dependent variables. The research included descriptive, correlational, and regression survey methodologies to determine the impact of various career development factors on workers' decision to either stay with or leave the organisation. The study used a quantitative research methodology to gather data, minimise bias, and provide reliable and valid findings that may be applied to a broader population (Dannels 2018).

Presently, a significant proportion of pupils encounter challenges while studying Mathematics, particularly in achieving proficiency (Darling-Hammond et al., 2020). Currently, students tend to prioritise their interaction

with the instructor and their own motivation and interest, rather than relying on peer learning assistants. Several studies have investigated the impact of peer learning assistants on the effectiveness of subject achievement, specifically focusing on their influence on institutions other than UiTM Sabah.

The presence of peer assistance may be limited due to the fact that the mathematical skill of most students is close to average (Fuchs et al., 2015) (Wood et al., 2020). In addition, the role of lecturer pedagogy is more appealing as it aims to enhance performance and productivity by fostering stronger connections, engagement, and satisfaction. This is achieved via the implementation of effective strategies that enable the growth and development of students (Foday, 2014).

CONCLUSION

As a result, peer learning assistance is the only independent variable not supported for this research like for a few reasons state in the discussion. Mathematics is essential for all university students, regardless of their major or minor. This topic is compulsory for developing fundamental abilities in many professions, including critical thinking, problem-solving, and reasoning. Nonetheless, the level of mathematical achievement among Malaysian university students has been a constant cause for worry. To solve this issue, it is necessary to analyze the factors that contribute to it. Besides, this research contributes to the development of effective instructional techniques and interventions for enhancing students' mathematics achievement. In addition, this study contributes to the corpus of information about the impact of motivation, peer-assisted learning, pedagogical quality, and student interest in optimizing mathematical accomplishment, which will have significant consequences for educational policy and practice.

REFERENCES

1. Ambussaidi, I.; Yang, Y.F. The impact of mathematics teacher quality on student achievement in Oman and Taiwan. Int. J. Educ. Learn. 2019, 1, 50–62
2. Appiah, J. B., Korkor, S., Arthur, Y. D., & Obeng, B. A. (2022). Mathematics achievement in high schools, the role of the teacher-student relationship, students' self-efficacy, and students' perception of mathematics. International Electronic Journal of Mathematics Education, 17(3), em0688. https://doi.org/10.29333/iejme/12056.
3. Arthur, Y. D., Dogbe, C. S. K., & Asiedu-Addo, S. K. (2022). Enhancing Performance in Mathematics Through Motivation, Peer Assisted Learning, And Teaching Quality: The Mediating Role of Student Interest. Eurasia Journal of Mathematics, Science and Technology Education, 18(2), em2072. https://doi.org/10.29333/ejmste/11509
4. Azmidar, A., Darhim, D., & Dahlan, J. (2017). Enhancing students' interest through mathematics learning. Journal of Physics: Conference Series.
5. Cook, D.A.; Artino, A.R. Motivation to learn: An overview of contemporary theories. Med Educ. 2016, 50, 997–1014.
6. Davadas, S. D. & Lay, Y. F. (2017). Factors Affecting Students' Attitude towards Mathematics: A Structural Equation Modeling Approach. EURASIA Journal of Mathematics, Science and Technology Education, 14(1), 517-529. https://doi.org/10.12973/EJMSTE/80356
7. Elshami, W., Abuzaid, M., & Abdalla, M. E. (2020). Radiography students' perceptions of peer-assisted learning. Radiography, 26(2), e109-e113. https://doi.org/10.1016/j.radi.2019.12.002
8. Emaikwu, S. O. (2011). Assessment of the impact of students' mode of admission into university and their academic achievement in Nigeria. International Journal of Academic Research in Progressive Education and Development, 1(3), 151-164.
9. Etikan, I., & Babtope, O. (2019). A basic approach in sampling methodology and sample size calculation. Med Life Clin, 1(2), 1006.
10. Fuchs, L. S., Fuchs, D., Phillips, N. B., Hamlett, C. L., & Earns, K. (1995). Acquisition and Transfer Effects of Classwide Peer-Assisted Learning Strategies in Mathematics for Students with Varying Learning Histories. School Psychology Review, 24(4), 604–620. https://doi.org/10.1080/02796015.1995.12085790

11. J. León, E. Medina-Garrido, and M. Ortega Viera, "Teaching quality: high school students' autonomy and competence," Psicothema, vol. 30, no. 2, pp. 218–223, 2018.
12. Khine, M. S., Al-Mutawah, M., & Afari, E. (2015). Determinants of affective factors in mathematics achievement: Structural equation modeling approach. Journal of Studies in Education, 5(2), 199-211.
13. M. R. Ilias & A. N. M Basir. Factors Influencing Values of Mathematics Among Mathematics Students in Tertiary Level. Asian Journal of Research in Education and Social Sciences, [S.l.], v. 4, n. 4, p. 46-56, jan. 2023.
14. Maaminm M., Maat, S. M., & Iksan, Z. H. (2021). Analysis of the factors that influence mathematics achievement in the ASEAN countries Cypriot Journal of Educational Science. 16(1), 371 – 388. https://doi.org/10.18844/cjes.v16i1.5535
15. Mamites, I., Almerino, P., Sitoy, R., Atibing, N. M., Almerino, J. G., Cebe, D., Ybañez, R., Tandag, J., Villaganas, M. A., Lumayag, C., Plando, D., Añero, M., Acebes, H. M., Maturan, F., Evangelista, S. S., Aro, J. L., Himang, C., & Ocampo, L. (2022). Factors Influencing Teaching Quality in Universities: Analyzing Causal Relationships Based on Neutrosophic DEMATEL. Education Research International, 2022. https://doi.org/10.1155/2022/9475254
16. Meke, K. D. P., Jailani, J., Wutsqa, D. U., & Alfi, H. D. (2019). Problem based learning using manipulative materials to improve student interest of mathematics learning. Journal of Physics: Conference Series, 1157(3), 032099. https://doi.org/10.1088/ 1742-6596/1157/3/032099
17. Okereke, S. C. (2006). Effect of proper knowledge of implications of mathematical tasks/ concepts to career types and gender n students' achievement, interest, and retention. U. Nzewi (Ed) STAN proceedings of the 47th annual conferences, 253-259.
18. Postareff, L., Mattsson, M., & Parpala, A. (2018). The effect of perceptions of the teaching-learning environment on the variation in approaches to learning-between-student differences and within-student variation. Learning and Individual Differences, 68, 96–107.
19. R. Singh and S. Sarkar, "Does teaching quality matter? Students learning outcome related to teaching quality in public and private primary schools in India," International Journal of Educational Development, vol. 41, pp. 153–163, 2015.
20. Salifu, A. S., & Bakari, A. (2022). Exploring the Relationship Between Students' Perception, Interest and Mathematics Achievement. Mediterranean Journal of Social & Behavioral Research, 6(1), 13-20. https://doi.org/10.30935/mjosbr/11491.
21. Santhanalakshmi, P. C., & Naomi, P. G. V. (2021). Impact of peer assisted learning strategy (PALS) for learning enhancement of students at secondary level. Turkish Journal of Computer and Mathematics Education, 12(10), 7333-7336.
22. Siraj, H., Syed, A. R., & Sultan, M. F. (2021). SMS advertising & its impact on consumer purchase intention: A comparative study of adults and young consumers in Pakistan. Journal of Marketing Strategies, 3(2), 1-22.
23. Tokan, M. K., & Imakulata, M. M. (2019). The effect of motivation and learning behaviour on student achievement. South African Journal of Education, 39(1), 1–8.
24. Wallace, T. L., Kelcey, B., & Ruzek, E. (2016). What Can Student Perception Surveys Tell Us About Teaching? Empirically Testing the Underlying Structure of the Tripod Student Perception Survey. American Educational Research Journal, 53(6), 1834–1868. https://doi.org/10.3102/0002831216671864
25. Wood, T., Mazzocco, M. M. M., Calhoon, M. B., Crowe, E. C., & Connor, C. M. (2020). The Effect of Peer-Assisted Mathematics Learning Opportunities in First Grade Classrooms: What Works for Whom? Journal of Research on Educational Effectiveness, 13(4), 601–624. https://doi.org/10.1080/19345747.2020.1772422
26. Y. D. Arthur, S. K. Appiah, K. Amo-Asante, and B. Asare, "Modeling student's interest in mathematics: Role of history of mathematics, peer-assisted learning, and student's perception," EURASIA Journal of Mathematics, Science and Technology Education, vol. 18(10), 2022.
27. Yusof, N. M., Karim, Z. A., Rashid, R. A., & Mohamed, Z. (2019). Factors Affecting Students' Achievement in Mathematics: Case Study in Terengganu. Jurnal Intelek, 14(2), 198 – 207. https://doi.org/10.24191/ji.v14i2.235