

Factors that Affect the Less Interest in Mathematics among Secondary School Students

Rose Affiza Binti Mohamad, Prof. Madya Dr. Nurfaradilla Binti Mohamad Nasri

Faculty of Education, The National University of Malaysia
Email: p145108@siswa.ukm.edu.my, tdakadfpnd@ukm.edu.my

DOI Link: <http://dx.doi.org/10.6007/IJARPED/v14-i3/26360>

Published Online: 10 September 2025

Abstract

Mathematics is often seen as a challenging subject for students because many of them find it difficult to understand. This leads to low and inconsistent exam results. Mathematics continues to be a tough subject for many students. However, the heavy syllabus and high level of difficulty cause many students to lose interest in this subject. Even though new methods such as project-based learning and social learning have been introduced, many students still face difficulties because they do not have a strong foundation in Mathematics. Besides that, the lack of interest in Mathematics, negative thoughts about themselves, the subject, and the way it is taught, also affect their motivation. This concept paper discusses the reasons and challenges that influence students' interest in learning Mathematics. The main goal is to explore these factors and suggest ways to improve students' interest in the subject. Mathematics is always important in our daily life. Therefore, it is important for everyone to work together to help students become skilled in thinking and solving problems. Since Mathematics plays a big role in both daily life and the future, cooperation from all parties is very much needed to help students build confidence and better problem-solving skills.

Keywords: Interest, Mathematics, Factors, Student Achievement, Secondary School

Introduction

Mathematics is one of the core areas of knowledge that shapes students' thinking and supports their future learning. Despite its importance, it is often regarded as a difficult and unpopular subject among many students. This perception is reflected in their performance, which in many schools remains inconsistent and frequently below the expected level. In the Malaysian context, the challenge is especially visible among secondary school students. Many of them face difficulties in mastering basic mathematical concepts, which not only affects their achievement but also weakens their interest in the subject. To address this, teachers and education authorities have attempted various approaches, such as revising assessment methods and placing greater focus on teaching and learning processes. However, the problem cannot be seen as stemming from students alone. A range of other factors, including the suitability of the curriculum, the effectiveness of teaching methods, and the influence of the

social and cultural environment, also play a role. This paper argues that students' lack of interest in mathematics arises from the interaction of these factors, rather than being caused purely by their own weaknesses.

What makes this study distinct is its attempt to look at the issue more broadly, by not limiting the discussion to students' difficulties alone. Instead, it considers how curriculum design, classroom practices, and wider sociocultural influences shape students' experiences with mathematics. In doing so, the study contributes to the field of social sciences by offering insights that may guide policymakers, educators, and curriculum developers in creating strategies that foster a more positive and lasting interest in mathematics.

Problem Statement

Challenges in Teaching Mathematics

Changes have been made in how students are assessed, with more focus given to tracking their learning progress. Every student needs to go through the learning process properly to understand the required learning standards. To support this, Classroom-Based Assessment (or PBD) has been introduced in Malaysia. This concept paper aims to explore the reasons why students are less interested in the subject of Mathematics. This is because when students fail to understand the basic concepts of the subject, it can have a deep impact, especially when they continue their studies to the next level of education. With the introduction of PBD, students are expected to master Content Standards and Learning Standards that are often too heavy and broad.

Classroom-Based Assessment (PBD) was introduced along with the implementation of the Secondary School Standard Curriculum (KSSM), starting in 2017. KSSM focuses on three main aspects, which are the Content Standard, the Learning Standard, and the Performance Standard. All three of these aspects are carefully considered in the preparation of the curriculum, where assessment is made an important part of the learning process. Teachers are not only responsible for delivering the lessons, but also for assessing students' achievement throughout the teaching and learning process. The role of a teacher and an assessor is not something easy, because teachers need to have enough knowledge to carry out both responsibilities effectively (Lana et al., 2015). To do this well, teachers must master the correct and suitable methods, as well as clearly understand the curriculum content (Lam, 2015).

To help teachers fully understand and teach the curriculum, the content that is too packed and the limited time to finish the syllabus have become reasons for the drop in students' performance in Mathematics. One of the main goals of education is to prepare students to meet the changing needs of society and daily life. In today's fast-moving world of information and technology, students need to develop higher-order thinking skills. This includes understanding concepts, making estimations, solving problems, giving criticism, thinking critically, analyzing, and creating something new and these skills are becoming more and more important (Birgin, 2011). To meet these needs, different teaching methods that focus more on students have been suggested. These include cooperative learning, project-based learning, and social constructivist learning. These methods are seen as better alternatives to traditional teaching styles, which mostly focus on the teacher (Shepard, 2000).

Even though many efforts and strategies have been made to help students reach their full potential, in line with the goals of the Ministry of Education Malaysia (KPM), the main problem is that many students lack a strong foundation in Mathematics. Without this basic understanding, it is difficult to achieve those goals. According to Sukima et al. (2012), some teachers believe that students must first learn all the basic facts and concepts before they can be encouraged to think critically. However, the lack of interest in Mathematics continues to be a common issue discussed among the public. This problem is often linked to students' negative beliefs. Many students feel that they are not good at Mathematics and think that the subject is too difficult or that they dislike the way it is taught. These negative thoughts affect their motivation and willingness to learn. There are many reasons why secondary school students lose interest in Mathematics. Because of that, the main aim of this concept paper is to explore the factors that influence students' interest in Mathematics and to suggest ways to increase their interest in the subject in the future.

Concept/Idea

This concept paper aims to examine how various factors influence students' interest in the subject of Mathematics. These factors include their early learning experiences, the use of creative, enjoyable, and relevant teaching methods, the way they view the importance of Mathematics, as well as the curriculum and content standards set by the Ministry of Education. This concept paper also suggests that further studies be conducted to assess how effective Classroom Assessment (Pentaksiran Bilik Darjah, PBD) is in increasing students' interest in Mathematics. This is important because ongoing research can help improve the quality of the country's education system.

Literature Review

Factors That Affect Student Interest

Attitude and interest

Many people say that students' interest and attitude are the main determinants of success in a subject. However, the question is what shapes these attitudes and interests? This argument emphasizes that a boring and unfriendly teaching system has a direct impact on their interest. If teachers still use traditional approaches without interactive and relevant elements, it is difficult for students to feel engaged. Several studies have shown that students' positive attitudes are greatly influenced by enjoyable and meaningful learning experiences.

Attitude is something that we cannot see directly, but it can be observed through a person's actions. Student performance in a lesson is directly related to the student's attitude. (Zaliza Mohamad Nasir and Zaitul Azma Zainon Hamzah 2014). A student's interest in Mathematics can influence whether they succeed or struggle in the subject. If students are not interested, they will pay less attention in class or fully engage in the lesson. Education is a process that aims to bring about positive changes in a person. Today, teachers face more challenges and one of their important roles is to find ways to spark students' interest in Mathematics to help them achieve better performance in the subject.

A study by Quek (2006) found that students' excellence in Mathematics is greatly influenced by positive student attitudes. Meanwhile, Heinze et al. (2005) argued that meaningful learning in general in Mathematics and excessive interest in calculations in Mathematics need to be distinguished if we want to make Mathematics a positive subject. Azizi Yahaya and

Shahrin Hashim (2008) emphasized that having a strong interest in a subject encourages students to explore it more deeply. Their study also showed that students' performance in a subject is closely related to their attitude. Students with a positive attitude are more likely to learn better. This idea agrees and coincides with the view of Ifamuyiwa (2004) who believes that a positive attitude, combined with consistent effort, leads to better achievement, as also supported by Jufrida et al. (2019). He explained that students with a positive attitude towards learning tend to work harder and achieve better results. A study conducted by Okeye (2013) in Ghana also found a strong relationship between students' attitude and their performance in Mathematics. This finding is in line with Nur's (2010) statement that there is a positive relationship between attitude and achievement in Mathematics. In addition, Mirza (2018) reported that students' success in Mathematics also influences their attitude towards the subject.

Chiu and Muhammad Sofwan Mahmud (2021) emphasized that positive attitudes play a very important role in determining student success. Their study examined various aspects of attitudes such as interest, self-confidence, anxiety, and perception towards Mathematics among pre-university students in Kinta Utara, Perak. The results of the study showed that these attitude factors had a significant impact on student achievement in the subject of Mathematics. This finding is in line with previous studies that also found a significant relationship between attitude and Mathematics performance. For example, Ma and Kishor (2012) also found that students who have a positive attitude towards Mathematics tend to achieve better results. In other words, students' feelings and emotions about learning Mathematics are closely related to their performance in the subject.

Good planning

Organized planning, fun teaching and the use of various appropriate methods are important elements in creating a learning environment that can attract the interest and focus of students in school. Overall, Mathematics has been an important part of human life since ancient times until now, and will continue to be relevant in the future. Therefore, it is the responsibility of all parties to work together in producing students who have analytical skills and the ability to think critically.

By understanding the factors that influence students' interest in Mathematics from a more holistic perspective, teachers can develop more effective strategies to improve students' interest and performance. This includes incorporating relevant elements from students' daily lives into the teaching and learning process. This can make Mathematics more meaningful and relatable to their lives. Mathematics is not just a regular academic subject in the school curriculum. It is a fundamental skill that plays an important role in shaping students' minds, analytical thinking, and problem-solving abilities. However, students' interest in Mathematics does not always match its importance. There are a variety of attitudes and responses to the subject from students who are very enthusiastic to those who are not interested. Exploring the factors that influence students' interest in Mathematics is important. It has a huge impact on their success in learning and mastering Mathematical concepts. These factors go beyond what happens in the classroom and include students' experiences outside of academia such as their home environment and local community.

Early Student Experience

Students' early experiences with Mathematics are among the main factors that influence their level of interest in the subject. Positive experiences that lead to success and satisfaction in solving Math problems can help build a strong foundation for long-term interest. Conversely, negative or disappointing experiences can lead to fear or lack of interest in Mathematics. According to Fischetti (2013), many children struggle with Mathematics at an early age because effective teaching methods to support their learning are not clearly understood. This is evidenced by the fact that there is little research conducted on the best methods for teaching Mathematics (Rohaty, 2022), even though children are naturally born with the potential to think mathematically (Geist, 2009). Smith (2006) also stated that Mathematics is indeed a challenging subject to learn. However, with the right teaching approach, it is possible to increase the achievement of all children, especially during the early stages of their education (Clarke et al. 2007; Duncan et al. 2011).

Ways of Teaching and Learning

The teaching and learning methods of Mathematics also play an important role in fostering student interest. A creative, fun and relevant approach to real-life situations can attract students' interest in this subject. This argument emphasizes that the teaching of Mathematics often fails to be linked to the real context of students' lives. As a result, students see Mathematics as something abstract and useless. The use of approaches such as digital games and project-based learning not only makes learning more interesting, but also helps build student understanding and engagement. The failure of teachers to apply these methods is one of the main causes of the lack of interest in this subject.

The use of technology, interactive games and practical applications of Mathematics concepts can increase students' motivation to learn. One approach that has proven to be effective is digital game-based learning, which supports 21st century learning objectives and helps ensure that students remain active during learning sessions (Abdolreza et al., 2017). This method not only encourages active student engagement, but also helps highlight their inner potential. According to Al-Azawi et al. (2016), the integration of digital game-based learning in Mathematics teaching can enrich the overall learning experience. Thus, the use of digital games in the classroom not only adds an element of fun to Mathematics learning, but also becomes an effective strategy to overcome student boredom. Furthermore, it is a good alternative to traditional methods that are too teacher-centered (Nor Adibah Abdullah, 2020).

Value Perception

Students' perceptions of the value of Mathematics also play an important role in shaping their interest in the subject. If they see Mathematics as important and useful in their daily lives and future careers, they are more likely to pay attention and make more effort to learn it. In addition, support and encouragement from family, peers and society can also influence students' interest in Mathematics. Attitude is something abstract and difficult to understand. However, it greatly affects an individual's life. Attitude refers to actions or views based on certain opinions. While perception is an impression or mental image formed in the heart or mind about something (Kamus Dewan 4th Edition 2007).

In general, perception is the activity or action of a person in evaluating something based on information received from external sources. According to Slamento (2010), perception is a

process related to information received by the human mind, which then creates a connection with the surrounding environment. This connection is made through sensory stimulation. Student perceptions may include their thoughts or feelings about the teacher, the teaching methods used, the content of the lesson or even learning tools such as the use of computers and other teaching aids. Student perceptions are also closely related to their daily lives and are one of the main factors that can increase student motivation over time. Ultimately, it has a positive impact on their personal growth.

Student Acceptance or Readiness

Another important factor in the learning process is the level of student acceptance or readiness to learn. According to Thorndike (1932), learning will be more effective when students are mentally prepared to receive knowledge. This means that teaching and learning will only be truly successful when students are open and ready to learn something that cannot be forced. In addition, motivation also plays a very large role in determining the direction and effectiveness of learning. Motivated students usually show high enthusiasm and are driven by internal desires, which are then supported by external incentives such as goals, rewards or recognition. These incentives can be in the form of money, grades, or praise. Meanwhile, motives stem from internal drives or personal tendencies that drive a person to act to achieve goals, even if it takes a long time. Since each student has different levels of interest and motivation, teachers need to provide additional support so that teaching and learning becomes more meaningful and relevant for each individual.

Community Perception

In a broader context, societal perceptions of Mathematics and how it is viewed in our culture also play a significant role. If Mathematics is seen as a difficult subject or only suitable for certain groups of people, this can negatively affect students' interest and belief in their ability to succeed in the subject. Societal perceptions also have a significant impact on students. Mathematics is often labelled as an elite subject that is only for smart students. This perception not only instills a sense of inferiority among students, but also makes them afraid to try. In addition, families and communities that are unsupportive or underestimate the importance of Mathematics also reinforce students' negative feelings towards the subject.

Studies have shown that some students develop negative beliefs about Mathematics even before they attempt to solve real problems (Marshall 1989). Furthermore, according to Ignacio et al. (2006), many students believe that Mathematics is the source of their anxiety and frustration. More worryingly, some even see Mathematics as a boring subject. Baki et al. (2009) also found that students' negative beliefs are often linked to the way Mathematics is taught. Their study showed that teachers often fail to connect Mathematics concepts with real-life situations in the classroom. As a result, students feel that Mathematics learning has little relevance or impact in their daily lives.

When teachers have a deeper understanding of the factors that influence students' interest in Mathematics, they can design more effective teaching strategies to continuously increase student engagement and inspire them to appreciate the importance and beauty of the subject. Through a comprehensive and motivation-based approach, we can produce a generation that is competent in Mathematics and ready to face the challenges of an increasingly challenging and complex world.

A Compact Syllabus

Another reason why students may lose interest in mathematics is because of the volume and difficulty of the syllabus studied. The topics studied in each level are too numerous and too complex for students to fully understand. A dense Mathematics syllabus containing difficult topics contributes to student stress and loss of motivation. A syllabus that does not consider the cognitive development level of students causes many students to fall behind from the very beginning. For example, students in Form One may feel stressed because some topics are too difficult for their level of thinking and understanding. This leads to additional stress and can reduce their motivation to develop a real interest in the subject of mathematics. Therefore, it is important to adapt the syllabus to better match the cognitive maturity of students. Topics should be arranged in a way that suits their developmental level to help increase their interest and performance in mathematics.

Higher Order Thinking Skills (HOTS), which were originally introduced at the secondary school level as an effort to advance the country's education system to keep pace with developed countries, have now become an issue of concern among the community. Its implementation has been criticized for being seen as not being in line with the maturity and age of students, thus raising questions about the suitability of this approach in our education system. HOTS requires deep analytical skills and creative thinking, which may not be in line with the cognitive development of students at certain stages. Therefore, it is necessary to review and adjust the implementation of HOTS to ensure that it is appropriate for our education system.

The Ministry of Education Malaysia (MOE) has begun to pay more serious attention to the implementation of Higher Order Thinking Skills (HOTS) since 2013. This effort is actually a continuation of the introduction of Critical and Creative Thinking Skills (CTS) which has been introduced since 1994. However, the implementation of HOTS as early as the primary school level has raised concerns among parents. They are worried that children will lose interest or give up on learning because they have difficulty understanding the requirements of the questions. This situation not only affects students' concentration, but also makes it difficult for teachers to teach using the HOTS approach because students' levels of thinking skills are not the same.

A challenging curriculum is not necessarily wrong, as it benefits students who are capable and enjoy academic challenges. However, the MOE should offer basic and easier content for students who need it. The issue is not about having a high or low level syllabus, but rather having a curriculum that is appropriate and matches the abilities and needs of students. Some students perform better and require more challenges, while others require simpler content. Therefore, the MOE should provide a more flexible syllabus, allowing teachers to plan lessons based on groups of students with similar abilities. It would be better if the MOE could plan learning according to the students' circumstances. The MOE needs to find solutions to make the syllabus flexible according to the students' suitability.

There are other studies that have presented theories related to factors that influence students' academic achievement. Among the factors associated with student achievement are interests, attitudes, learning styles, teaching methods and family background. In addition to teaching aids and materials, their teaching and learning activities and experiences also contribute to student achievement according to Biggs et al. (1993). According to Woolfolk

(1998) defines a person's learning success as influenced by the student's own interests and efforts. According to Abdul Halim Mohamad and Wan Mohamad Wan Sulong (2006), the results of their study on Bachelor of Arabic Language students at Public Higher Education Institutions in Malaysia show that students' attitudes and interests towards the subject of Arabic Language play an important role in determining their success. A study by Noraini Omar (2008) also found that there is a relationship between students' attitudes and their achievement in Islamic Education subjects. Meanwhile, Rahmad Sukor Ab Samad and Gooi Ai Wei (2005) found that students who show a positive interest in mathematics tend to achieve higher achievement compared to students who are less interested. In this case, teachers also need to be smart in identifying and selecting the most suitable teaching materials and using available resources optimally to ensure that teaching objectives can be achieved effectively.

Conclusion

This conclusion states that interest plays an important role in whether a student succeeds or struggles in the subject of Mathematics. When students are not interested or do not want to learn Mathematics, they often pay less attention in class which ultimately affects their ability to learn effectively. Therefore, it is very important for teachers to find ways to attract students' interest especially in today's changing education system. Teachers must be able to motivate and inspire students to help them succeed in the future.

Education is more than just sharing knowledge; it is also about shaping students and helping them grow which involves shaping and changing the students as they progress in education. Teachers need to have a deep understanding of what influences students' interest in mathematics so that they can create better and more engaging lessons. This means not just teaching facts but encouraging students to actively engage in learning. Creative and engaging teaching methods need to be used to make Mathematics more fun. By using different learning strategies, teachers can create a fun and exciting environment. This will help students to be more engaged, build a strong understanding of Mathematics and achieve better results.

In short, mathematics has been an important part of our daily lives from ancient times to the present and the future. Therefore, cooperation from all parties is very important to develop students who are strong in Mathematics and can think clearly. By encouraging a positive attitude towards mathematics, we can help produce a generation that is skilled and ready to face the complex challenges of today's global world. Finally, as a conclusion, various factors influence students' lack of interest in the subject of Mathematics. However, the main cause is not solely in the students themselves, but rather the existence of systemic weaknesses in the curriculum, pedagogy, assessment and environmental influences. If the authorities really want to increase students' interest in Mathematics, comprehensive reforms need to be carried out. This includes restructuring the content, continuously training teachers in modern pedagogy, and involving parents and society in forming a positive perception of this subject. Without concrete and comprehensive reforms, students' interest in Mathematics will continue to decline and widen the achievement gap between capable students and those who drop out. Instead, by implementing progressive changes that focus on the real needs of students, we can not only build a generation of mathematically literate students, but also produce citizens who are prepared to face the complex challenges of a modern world driven by data, technology and analytical thinking. Now is the time to act because the future of Mathematics in our education depends on the decisions made today.

References

- Abdolreza, L., Aida Suraya, M. Y., & Kamariah, A. B. (2017). Comparison of new mathematics teaching methods with traditional method. *PEOPLE: International Journal of Social Sciences*, 3(2), 1285–1297. <https://doi.org/10.20319/pijss.2017.32.12851297>
- Mohamad, H., & Sulong, W. M. W. (2006). Antara minat dan sikap pelajar terhadap bahasa Arab: Satu kajian ke atas pelajar sarjana bahasa Arab di IPTA Malaysia. In *Prosiding Wacana Pendidikan Islam Siri ke-5* (pp. 9–18). Universiti Kebangsaan Malaysia.
- Al-Azawi, R., Al-Faliti, F., & Al-Blushi, M. (2016). Educational gamification vs. game-based learning: Comparative study. *International Journal of Innovation, Management and Technology*, 7(4), 131–136. <https://doi.org/10.18178/ijimt.2016.7.4.659>
- Yahaya, A., & Hashim, S. (2008). Sumbangan sikap terhadap pencapaian pelajar dalam mata pelajaran matematik, permasalahan dalam pendidikan sains dan matematik. *Universiti Teknologi Malaysia*, 109–108.
- Baki, A., Çatlıoğlu, H., Coştu, S., & Birgin, O. (2009). Conceptions of high school students about mathematical connections to the real life. *Procedia - Social and Behavioral Sciences*, 1(1), 1402–1407. <https://doi.org/10.1016/j.sbspro.2009.01.247>
- Biggs, J. B., & Moore, P. J. (1993). *The process of learning* (3rd ed.). Prentice Hall.
- Birgin, O. (2011). Pre-service mathematics teachers' views on the use of portfolios in their education as an alternative assessment method. *Educational Research and Reviews*, 6(11), 710–721.
- Chiu, Y. K., & Mahmud, M. S. (2021). Hubungan sikap dengan pencapaian matematik T pelajar pra-universiti di Kinta Utara, Perak. Paper presented at *Education, Social Sciences and Technology 2021 (IVEST2021)*, Kuala Lumpur, Malaysia.
- Clarke, B., Baker, S. K., & Chard, D. J. (2007). Measuring number sense development in young children: A summary of early research. *Leadership to Math Success for All*, 5(1), 1–11.
- Pustaka, D. B. (2007). *Kamus Dewan* (4th ed.). Dewan Bahasa dan Pustaka.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Doabler, C., Baker, S. K., Smolkowski, K., Fien, H., Clarke, B., Cary, M. S., & Chard, D. (2011). Impact and implementation analyses of the ELM kindergarten mathematics intervention. *SREE Spring 2012 Conference Abstract Template*.
- Fischetti, J. C. (2013). Issues in education: Last stand for teacher education. *Childhood Education*, 89(1), 40–41. <https://doi.org/10.1080/00094056.2013.757531>
- Geist, E. (2009). *Children are born mathematicians: Supporting mathematical development, birth to age 8*. Pearson Education.
- Heinze, A., Reiss, K., & Rudolph, F. (2005). Mathematics achievement and interest in mathematics from a differential perspective. *ZDM – International Journal on Mathematics Education*, 37(3), 212–220. <https://doi.org/10.1007/s11858-005-0011-7>
- Ifamuyiwa, A. S. (2004). A study of the relationship between students' achievement in and attitude towards secondary school mathematics. *Olabisi Onabanjo University Journal of Educational Studies*, 5(1), 35–42.
- Ignacio, N. G., Blanco Nieto, L. J., & Barona, E. G. (2006). The affective domain in mathematics learning. *International Electronic Journal of Mathematics Education*, 1(1).
- Jufrida, J., Kurniawan, W., Astalini, A., Darmaji, D., Kurniawan, D. A., & Maya, W. A. (2019). Students' attitude and motivation in mathematical physics. *International Journal of Evaluation and Research in Education (IJERE)*, 8(3), 537–544.

- Lam, R. (2015). Language assessment training in Hong Kong: Implications for language assessment literacy. *Language Testing*, 32(2), 169–197. <https://doi.org/10.1177/0265532214554321>
- Lane, K. L., Oakes, W. P., Powers, L., Diebold, T., Germer, K., Common, E. A., & Brunsting, N. (2015). Improving teachers' knowledge of functional assessment-based interventions: Outcomes of a professional development series. *Education and Treatment of Children*, 38(1), 93–120.
- Ma, X., & Kishor, N. (2012). Assessing the relationship between attitude toward mathematics and achievement in mathematics. *Journal of Educational Research*, 90(1), 26–41. <https://doi.org/10.1080/00220671.1996.9944438>
- Marshall, S. (1989). Affect in schema knowledge: Source and impact. In D. B. McLeod & V. M. Adams (Eds.), *Affect and mathematical problem solving: A new perspective* (pp. 49–58). Springer.
- Mirza, A. (2018). Performing below the targeted level: An investigation into KS3 pupils' attitudes towards mathematics. *Journal of Education and Educational Development*, 5(1), 8–24. <https://doi.org/10.22555/joeed.v5i1.1572>
- Nur, S. (2010). The relationship between the attitudes towards mathematics and learning styles. *Procedia - Social and Behavioral Sciences*, 9, 644–648. <https://doi.org/10.1016/j.sbspro.2010.12.211>
- Nor Adibah Abdullah, N. E. H. M., & N. A. (2020). Students' perceptions towards mathematical softwares based learning. *Sains Humanika*, 3(1), 1–8.
- Omar, N. (2008). Faktor-faktor yang mempengaruhi pencapaian pelajar dalam mata pelajaran Pendidikan Islam tingkatan lima. *Jurnal Pendidikan, Institut Perguruan Tun Abdul Razak, Sarawak*, 33(1), 45–60.
- Okyere, M., Mensah, J. K., & Kuranchie, A. (2013). Student attitude towards mathematics and performance: Does the teacher attitude matter? *Journal of Education and Practice*, 4(3), 132–139.
- Quek, M. L. (2006). Hubungan antara sikap, minat, pengajaran guru dan pengaruh rakan sebaya dengan pencapaian matematik di kalangan pelajar tingkatan empat di daerah Batu Pahat, Johor (Unpublished master's thesis). Universiti Teknologi Malaysia.
- Samad, R. S., & Gooi, A. W. (2005). Hubungan antara iklim sekolah dengan kepuasan kerja guru sekolah menengah di Wilayah Persekutuan. *Jurnal Pendidikan*, 25(1), 163–178.
- Mohd. Majzub, R. (2012). Preschool children's early mathematics achievement based on gender and ethnicity. *Asian Social Science*, 8(16), 24–29. <https://doi.org/10.5539/ass.v8n16p24>
- Shepard, L. A. (2000). The role of assessment in a learning culture. *Educational Researcher*, 29(7), 4–14. <https://doi.org/10.3102/0013189X029007004>
- Saad, S., Saad, N. S., & Dollah, M. U. (2012). Pengajaran kemahiran berfikir aras tinggi: Persepsi dan amalan guru matematik semasa pengajaran dan pembelajaran di bilik darjah. *Jurnal Pendidikan Sains & Matematik Malaysia*, 2(1), 18–36.
- Smith, S. S. (2006). *Early childhood mathematics* (3rd ed.). Allyn & Bacon.
- Slameto. (2010). *Belajar dan faktor-faktor yang mempengaruhinya*. Rineka Cipta.
- Thorndike, E. L. (1932). *The fundamentals of learning*. Teachers College, Columbia University.
- Woolfolk, A. (1998). *Educational psychology* (7th ed.). Allyn & Bacon.
- Nasir, Z. M., & Hamzah, Z. A. Z. (2014). Sikap dan motivasi pelajar terhadap pembelajaran bahasa Melayu. *Procedia - Social and Behavioral Sciences*, 134, 408–415. <https://doi.org/10.1016/j.sbspro.2014.04.262>