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Systematic Review of Literature on Motivation in Learning Mathematics and its Effects on Students' Performance in Secondary Schools

Ezekiel Zakka[1]

Department of Science and Mathematics, Faculty of Educational Sciences and Technology
Universiti Teknologi Malaysia, Johor Bahru
Email: ezekielzakka@graduate.utm.my

Norulhuda Ismail (PHD)[2]

Faculty of Educational Sciences and Technology, Universiti Teknologi Malaysia, Johor Bahru
Email: p-norulhuda@utm.my

Najua Syuhada Ahmad Alhassora (PHD)[3]

Faculty of Education Sciences and Technology, Universiti Teknologi Malaysia Johor Bahru
Email: najuasyuhada@utm.my

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Abstract

This study explores the influence of intrinsic and extrinsic motivation on the academic performance of secondary school students in mathematics across different global contexts. Persistent underachievement in mathematics has been a concern in many regions, and motivation is increasingly recognized as a key factor in addressing this issue. Drawing from a systematic review of empirical studies conducted both within and beyond Nigeria, this paper examines the impact of intrinsic motivation, extrinsic motivation, and amotivation on student learning outcomes. A particular emphasis is placed on the observed decline in motivation among students in African countries, especially Nigeria, where a tendency to disengage from mathematics is becoming more common. The impact of motivation on student's academic achievement and learning outcomes in mathematics among secondary school students in Nigeria. Despite Nigeria's significant role in the region, there is a notable shortage of research specifically addressing students' motivation in mathematics. To bridge this gap, this review synthesizes findings from peer-reviewed international journals. Among the key insights is the role of collaborative learning in strengthening intrinsic motivation, thereby promoting greater engagement and improved performance in mathematics. In contrast, extrinsic motivators, such as rewards, appear to have only short-term effects. The findings highlight the importance of adopting context-sensitive and sustainable motivational strategies to support mathematics learning and enhance academic achievement at the secondary school level.

Keywords: Motivation, Academic Performance, Secondary Education, Mathematics Learning

Introduction

A significant factor influencing students' success in mathematics is their motivation toward the subject. Motivation plays a crucial role in shaping how students tackle mathematical tasks, endure challenges, and ultimately attain learning results. Mathematics is a fundamental subject in secondary education and serves as an essential pathway to various academic and career fields. Nevertheless, the ongoing issue of students consistently underperforming in mathematics is a global challenge. In light of this, researchers have increasingly focused on the impact of both intrinsic and extrinsic motivational factors on mathematics performance. A thorough understanding of this relationship is crucial for educators, policymakers, and researchers who aim to enhance academic success in mathematics.

The framework guiding this review is primarily rooted in Self-Determination Theory (SDT), which places motivation on a spectrum ranging from intrinsic to extrinsic. SDT asserts that students who experience autonomy, competence, and a sense of connectedness are more likely to be intrinsically motivated, which in turn fosters deeper engagement and enhanced performance. Conversely, students driven by extrinsic motivation may achieve temporary success but often struggle to maintain long-term interest. While SDT provides a foundational understanding of motivational quality, other theories offer complementary perspectives. For instance, Expectancy-Value Theory emphasizes students' beliefs about their abilities and the value they place on tasks, while Achievement Goal Theory focuses on the orientation students adopt toward learning goals (e.g., mastery vs. performance). Together, these frameworks offer a more comprehensive basis for examining the relationship between motivational factors and academic performance in mathematics.

Although there is a substantial amount of research on mathematics education, a significant portion has concentrated on cognitive and instructional factors, with comparatively less attention paid to affective and motivational elements. Even though there is an increasing acknowledgment of the significance of motivation, current studies differ significantly in their focus, approaches, and findings, complicating the ability to draw definitive conclusions. It is essential to consolidate existing research to clarify how motivation relates to mathematics performance, pinpoint consistent patterns, and illuminate areas of disagreement.

Past studies have either concentrated on general academic motivation or focused on mathematics achievement without thoroughly exploring their interrelationship. Numerous studies tend to investigate motivation in a vacuum or lack a strong theoretical foundation. There is a scarcity of synthesis that links motivational factors directly to performance results in secondary mathematics education. This deficiency highlights the need for a systematic review that critically assesses and unifies findings from various contexts and research methods.

This review specifically aims to address the following objectives:

1. Determine the various types and aspects of motivation explored in connection with mathematics achievement;
2. Investigate the theoretical models that support these studies;
3. Evaluate the reliability and consistency of the established connections; and
4. Emphasize the implications for forthcoming research, practice, and policy.

Developed countries and China have consistently exhibited outstanding performance in mathematics. Nevertheless, there is an alarming trend of decreasing motivation among students in Africa toward mathematics, with many showing tendencies to avoid the subject. There is a notable scarcity of research on students' motivation in learning mathematics in Nigeria, as observed in previous studies (Abubakar & Fashiku, 2015; Tella, 2007), despite the country's influential role in Africa. The aim of this study is to address the identified research gap by systematically examining global scholarly literature on motivation in learning. This approach offers a foundation for understanding its impact on students' academic performance, especially in mathematics.

Methodology

SCOPUS, a multidisciplinary database of peer-reviewed journals, was the primary source of articles and ERIC, a digital library sponsored by the U.S. Department of Education, was also used to access indexed and full-text education literature.

Including studies from different regions is essential for ensuring a well-rounded and comprehensive literature review. By incorporating research conducted in North America, Europe, Asia, Africa, and other parts of the world, we capture a broad range of educational systems, cultural contexts, socio-economic conditions, and policy environments. This diversity helps us identify both universal patterns and region-specific differences in the variables influencing mathematics performance. It also strengthens the generalizability of our conclusions and reduces the risk of bias that might result from relying solely on studies from a single geographic area.

To achieve this, we supplemented our review with peer-reviewed journal articles available through the Universiti Teknologi Malaysia (UTM) library, as well as relevant electronic journals retrieved from Google Scholar, ScienceDirect, and broader online searches. The initial search generated 20,854 articles related to our study conducted between the year 2018 and 2024. We further refined the subject by themes and generated 2,025 articles on mathematics performance, 1,705 articles on mathematics education and 1,719 on motivation. We further filtered the articles and generated 508 articles. Finally, twenty-nine (29) articles met the criteria and were reviewed based on topics on motivation and students' performance in mathematics.

Line guidance issued by PRISMA was used to conduct a systematic review on motivation and performance in mathematics. Article sources were derived from Scopus and (ERIC) considering some of the conditions set by the steps of the review process (identification, screening and eligibility) as well as data abstraction and analysis.

PRISMA

In this review, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were rigorously followed to ensure a transparent and replicable process.

- **Identification**: A comprehensive search was conducted across multiple databases (e.g., Scopus, Web of Science, ERIC) using a defined set of keywords and Boolean operators. This initial search yielded a total of (508) records.

- **Screening**: After removing duplicates (12) records), titles and abstracts were screened for relevance based on predefined inclusion and exclusion criteria. This led to the removal of (243) studies.
- **Eligibility**: The remaining (224) full-text articles were assessed in detail to determine their methodological quality and relevance to the research questions. Studies not meeting the criteria (e.g., non-empirical, insufficient data) were excluded, with reasons documented.
- **Inclusion**: A final set of (29) studies were included in the qualitative/quantitative synthesis. These studies directly addressed the focus of the review and met all inclusion criteria.

Sierra-Correa and Cantera Kintz (2015) identified three main strengths of using PRISMA in systematic reviews:

1) Defining clear research questions that permits systematic research.
2) Identifying inclusion and exclusion criteria and
3) Attempting to examine large database of scientific literature in a defined time. The PRISMA Statement allows for rigorous search of terms related to motivation and student achievement.

Resources and Search Strategy

This systematic review followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological transparency and reproducibility. The review process was carried out from January to June 2024, covering four major phases: Identification, Screening, Eligibility, and Inclusion.

Database Selection

The literature search was conducted using two primary academic databases; ERIC and Scopus—chosen for their comprehensive coverage and relevance to the topic of mathematics education.

- ERIC (Education Resources Information Center) is a leading abstract and citation database that specializes in educational research. It indexes over 35,000 journals across more than 256 disciplines, including their relevance to education and mathematics research. With over 100 years of backfile data, ERIC provides rich citation metadata. It is maintained by Clarivate Analytics, which evaluates journals using three metrics: total citations, number of papers, and citations per paper; Clarivate (2023).
- Scopus is a multidisciplinary abstract and citation database that includes over 18,000 peer-reviewed journals from more than 5,000 publishers. It spans diverse subject areas, including science, social sciences, environmental science, biological sciences, and agriculture. Scopus is widely regarded for its broad and reliable academic coverage, especially in interdisciplinary research contexts.

PRISMA Process and Timeline

The review followed the PRISMA four-phase process over six months:

- Identification (January–February 2024): A comprehensive search strategy was implemented in ERIC and Scopus using targeted keywords and Boolean operators (e.g., *"mathematics performance"*, *"student factors"*, *"teacher influence"*). The initial search yielded [508] records.

- Screening (March 2024): After removing (12) duplicate entries, a total of (496) records remained. These were screened by title and abstract based on predefined inclusion and exclusion criteria, resulting in the removal of (243) irrelevant studies.
- Eligibility (April 2024): The full texts of (224) articles were assessed in-depth. Studies were excluded if they were not peer-reviewed, lacked empirical evidence, or were not aligned with the study objectives. A total of (479) studies was excluded at this stage.
- Inclusion and Analysis (May–June 2024): (29) studies met all criteria and were included in the final synthesis. These articles were analyzed thematically to extract patterns related to student- and teacher-related factors influencing mathematics performance.

Systematic Review Process

The systematic review was conducted in four main stages. In January 2024, the survey process was carried out. Confusing sentence. Relevant keywords were selected during the initial search phase based on prior studies. Thesaurus and catchphrases that were found to be associated with motivation variables and mathematical achievement were selected, based on previous research (Table 2). Two versions of the articles were removed at this point following a thorough screening process.

The next step was screening; at this point, 479 items were removed out of 508 that were eligible to be examined. The whole articles were acquired at the third stage, eligibility.
After careful evaluation, a total of 491 papers were excluded because some of them did not focus on motivation and students' performance. A total of 29 articles were obtained from the final survey phase and used for the analysis.

Eligibility Criteria

Studies were selected based on specific inclusion and exclusion criteria to ensure the relevance, quality, and consistency of the review. Only peer-reviewed journal research articles published in English between 2018 and 2024 were included. These criteria were applied during both the screening and eligibility phases to filter out non-relevant or low-quality sources. Such filtering is essential to ensure that only high-quality, up-to-date, and methodologically sound studies inform the review. By focusing on recent peer-reviewed literature, the review reflects current knowledge, avoids outdated findings, and ensures the credibility and reliability of the conclusions drawn.

Table 1
Eligibility Criteria

Criterion	Inclusion	Exclusion
Literature Type	Journal research articles	Systematic reviews, book series, books, book chapters, conference proceedings
Language	English	Non-English
Publication Date	Between 2018–2024	Before 2018

These criteria ensured that the review focused on recent, original research relevant to motivation variables that affect mathematics performance.

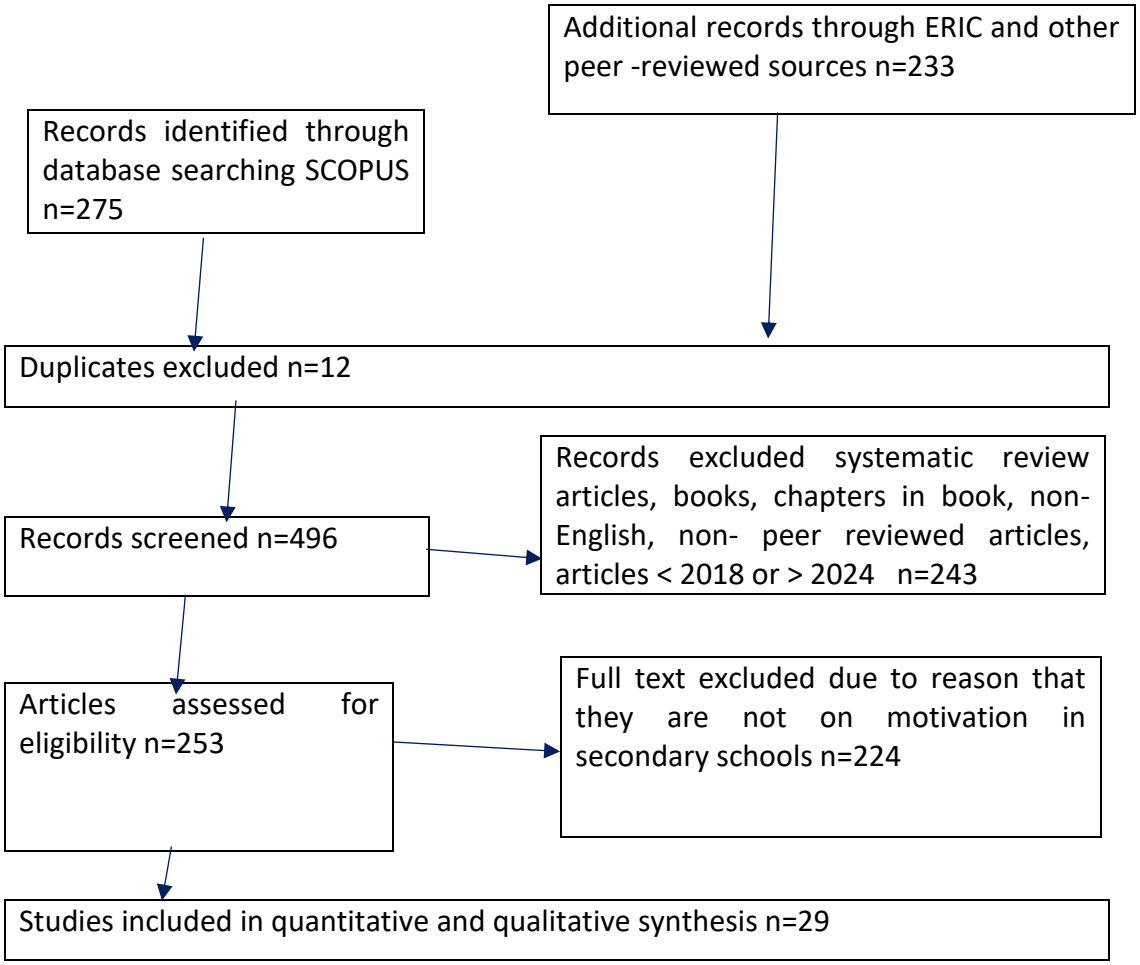
The Search String Used for the Systematic Review Process

Based on a combination of prior research, pertinent theoretical frameworks, and advice from subject-matter experts, the keywords utilized in this systematic review were carefully selected. By doing this, the search technique was guaranteed to find the most pertinent literature. To improve the findings and incorporate variations of important terms, truncation symbols, phrase searching, and Boolean operators (such as AND and OR) were used. Multiple academic databases were searched in order to minimize publication bias and increase coverage.

Table 2

The search string used for the systematic review process

Data bases	Keywords used
SCOPUS	TITLE-ABS- KEY ("motivation" OR "effect of motivation") AND mathematics motivation in secondary schools ("mathematics achievement" OR "mathematics performance" OR "students' achievement" OR "students' performance") "Motivation in learning mathematics".
ERIC	"Intrinsic motivation" OR "extrinsic motivation*") AND ("mathematics achievement" OR "mathematics performances" OR "students' achievement" OR "students' performance") motivation and students' performance



The review included only:

1. peer- reviewed scholarly articles
2. Peer- reviewed articles on motivation factors that affect students' performance in mathematics.
3. Peer-reviewed scholarly articles published from 2018 to 2024.
4. Articles in international perspective on motivation that affect students' performance in mathematics in senior secondary schools.
5. Factors that are either extrinsic or intrinsic motivation.
6. Quantitative and qualitative articles were also included.

Articles were excluded based on the following criteria.

1. Non-peer reviewed articles.
2. Articles published before 2018 unless it is critical and impactful.
3. Media generated articles and news-paper.
4. Articles not published in English language.

Table 3:

Summary of Studies on Motivation and performance in Mathematics

This table presents studies from different countries that examine how motivation affects students' performance in mathematics.

Author	Year	Motivational Variables studied	Research Design	Sample Size	Key Findings	Country
Abalde, G.D. & Oco, R.M.	2023	Motivation study time, Confidence, study habit, Attitude	Correlational	231	Students' achievement in mathematics was greatly influenced by their study habits and learning techniques. Although these behaviors had a favorable impact on attitude, they had no correlation with self-confidence/ motivation.	Cagayan de Oro City, Philippines
Abín, A. Núñez, J.C. Rodríguez, C. Cueli, M. García, T. Rosário, P.	2020	Motivation for learning, parental influences, homework, study time and interest	Survey	89	There is a substantial correlation between time spent with motivation. The majority of students who study for more than two hours a day with motivation attain high levels of success in mathematics as findings shows that they are statistically significant.	Spain and Portugal

Abramovich, S., Grinshpan, A. Z., & Milligan, D. L.	2019	Motivation	Survey	40	According to the motivation results, students' performance in mathematics improved and there was a comparatively high degree of learning motivation.	New York-USA
Ulum, H., & Alkış Küçükaydın, M.	2024	Motivation	Quantitative Cross-Sectional	534	Supportive peer interactions improve math performance by fostering motivation, whereas social support by itself has little direct impact on this relationship.	Turkey
Alzahrani, K. S.	2022	Metacognition, motivation and students' performance	Qualitative case study	13	It has been claimed that students' sense of control over their own learning can be improved by their self-confidence. Their drive to improve their thinking techniques in daily situations also helped them succeed by providing them with internal incentives, which increased their level of satisfaction with their educational journey as students.	Saudi-Arabia
Arthur, Y. D., Dogbe, C. S. K., & Asiedu-Addo, S. K.	2022	Peer tutoring, teaching quality and motivation,	Descriptive Survey	321	The results demonstrated that the mathematics performance of Ghanaian senior high school students was significantly improved by peer tutoring, instructional quality, and student motivation.	Ghana
Asanre, A. A.	2024	Motivation and students' performance	Descriptive Survey	300	Intrinsic motivation, extrinsic motivation, self-efficacy, and goal orientation all had a positive influence on academic achievement. Together, these motivational factors had a strong overall effect on students'	Ijebu-Ode Ogun state Nigeria

					performance. In particular, they significantly impacted mathematics achievement among senior secondary students in Ijebu Ode, Nigeria.	
Asigigan, S.I., & Samur, Y.	2021	Intrinsic motivation, problem-solving skills	Survey	47	The findings show that motivation significantly and favorably affects students' ability to think critically.	Turkey
Bardach, L., Oczlon, S., Pietschnig, J., & Lüftenegger, M.	2020	Motivation	Survey	68	Students prefer to align their achievement goals with the prevalent goals in their learning environment. The greatest substantial influence was linked to goals aimed at avoiding failure. Students' individual aspirations were significantly impacted by the class's motivating environment.	Austria
Dincer, S.	2020	Motivation, Materials	Survey	2140	When creating materials and education, motivation must be considered.	Turkey
Diseth, Å. Mathisen, F.K.S. Samdal, O.	2020	Extrinsic and intrinsic motivation	Correlational	3203	Extrinsic motivation was stronger among students than intrinsic motivation, and there were significant grade-level variations in both. The extrinsic motivation subscales and intrinsic motivation were positively connected with perceived academic success.	Norway

Doño, M. J. A., & Mangila, B. B.	2021	Extrinsic and intrinsic motivation	Correlational	41	The study emphasizes how students' willingness to learn mathematics is impacted by teachers' involvement in the classroom. Focus groups, interviews, and surveys yield both quantitative and qualitative data that are consistent. But the results are insufficient to justify an intervention program, therefore the school should work with teachers and students to design an action plan.	Philippines
Ebele C. O. Odiri E. O.	2023	Motivation	Correlational	1650	The study's findings indicated a negative correlation, and most students expressed high levels of motivation. There was no discernible relationship between students' academic motivation and their mathematical proficiency. There were also notable differences in the academic achievement of students with strong and low motivation in mathematics.	Delta state, Nigeria
Erhuvwu, O. S., & Adeyemi, F. T.	2019	Motivation	Correlational	243	The results showed that students were highly motivated by curiosity, relevance, confidence, and satisfaction, all of which helped them achieve very well in mathematics. Their desire had a direct impact on their academic achievement. In order to maintain their drive and keep them interested in learning, interest was crucial.	Edo state, Nigeria

El-Adl, A. Alkharusi, H.	2020	Intrinsic and extrinsic motivation, text anxiety, task value, control of learning beliefs, self-efficacy and academic achievement.	Survey	238	The findings demonstrated that students' high levels of motivation stemmed from their interest, relevance, confidence, and contentment, all of which contributed to their exceptional performance in mathematics. Their academic success was directly impacted by their passion. Interest was essential to sustaining their motivation and sustaining their interest in studying.	Sultanate of Oman
Fuqoha, A. A. N., Budiyono, B., & Indriati, D.	2018	Motivation and mathematics learning	Survey	86	The survey's findings indicate that students are highly motivated to learn mathematics. The findings indicate that many students who are highly motivated to learn mathematics are not satisfied with the importance of daily assessments. It demonstrates that obtaining a desirable value requires more than just a high level of learning motivation.	Central Java, Indonesia
Fiorella, L., Yoon, S. Y., Atit, K., Power, J. R., Panther, G., Sorby, S., Uttal, D. H., & Veurink, N.	2021	Motivation self-regulation, self-efficacy and test anxiety	Survey	536	Among secondary students, test anxiety significantly correlated negatively with mathematical accomplishment, but intrinsic drive, self-regulation, and self-efficacy showed a high positive link with mathematics performance.	USA
Guo, W., & Zhou, w.	2021	Motivation, self- efficacy and test anxiety	Correlational	1082	Male students showed lower exam anxiety, extrinsic, and intrinsic motivation than females. Teacher scaffolding feedback and praise strongly predicted	

					motivation for both genders. Female students' extrinsic motivation decreased with verification feedback; males showed no such link. Male students' intrinsic motivation dropped with directive feedback, while females' extrinsic motivation increased.	
Hutajulu, M., Wijaya, T. T., & Hidayat, W.	2019	Motivation, problem solving	Correlational	34	The results demonstrated that students' ability to solve problems positively affected their performance by significantly affecting their aptitude for mathematics and motivation to learn. Mathematically, the problem-solving variable can be determined.	Cimahi, a city in West Java, Indonesia
Gok, T.	2021	Students' Attitude, Motivation	Survey	2118	From ninth to twelfth grade, students' perceptions of STEM in both urban and suburban locations deteriorated. In every category, STEM attitude scores were consistently higher for male students than for female students. No matter where the students were located, same pattern was seen.	Izmir, Turkey
Habók, A. Magyar, A. Németh, M.B. Csapó, B.	2020	Self- efficacy, Self-concept, Motivation, Interest	Survey	2049	The results of structural equation modeling confirmed the mediating role of self-related and motivational factors on academic performance in Grades 6 and 8, even if not all of the predicted pathways fit the model. The non-	Hungary

					cognitive sixth-graders' achievement was most influenced by their self-concept.	
Hossein-Mohand, H. Hossein-Mohand, H.	2023	Motivation, teaching resources, and study time	Survey	2018	By promoting problem-solving skills and giving constructive criticism, teachers play a crucial role in helping pupils gain confidence. Building drive and a positive self-concept is just as important as cognitive development. While growing interest in reading fosters confidence and self-evaluation, improving self-concept in mathematics improves success.	Spain
Mengyao, H., Ismail, Z., Ismail, N., & Xueting, H.	2024	Motivation	Survey	384	The results demonstrated the extremely low level of motivation among Ningbo high school students. Two significant factors contributing to this low motivation were found to be students' lack of confidence as a result of the perceived difficulty of mathematics and their view that mathematics has limited relevance to real-world circumstances.	Ningbo, a major city in China
Ning, B.	2020	Disciplinary climate, intrinsic and extrinsic motivation	Survey	334	The analysis' findings showed how difficult it is to help Shanghai schools' children meet all three of the learning objectives for mathematics at the same time. While a disciplined educational environment is good for students' performance in mathematics, it may	Uyo, Akwa Ibom State, Nigeria

					be detrimental to their instrumental drive.	
Sahanata, M., & Dewi, F. K.	2022	Motivation	Randomized Control Group Design	60	The ARCS learning model significantly increased students' learning motivation across all four components: Attention, Relevance, Confidence, Satisfaction. The experimental group showed higher motivation than the control group.	MTs Negeri 1 Tebo, Indonesia.
Schreglmann, S.	2018	Motivation	Quasi-Experimental	149	The findings demonstrated that the experimental group's learning motivation levels before and after the therapy differed. These findings demonstrated the effectiveness of cognitive restructuring strategies in raising students' motivation for learning.	Hatay, Turkey
Tran, L. T., & Nguyen, T. S. S.	2021	Academic motivation	Correlational	680 univ. students	The study highlights that while amotivation negatively affects mathematics achievement, intrinsic motivation and other positive motivational factors enhance it. Therefore, fostering students' motivation should be a key focus for teachers to improve mathematics performance.	Vietnam
Ugama, J. O.	2018	Motivation	Survey	120	The study's findings indicated that motivation affects students' academic performance in mathematics. Students that are driven focus more carefully on their mathematical studies, which increases their learning of the subject.	EbonyiState, Nigeria

Zhang, Y., Yang, X., Sun, X., & Kaiser, G.	2023	Intrinsic and extrinsic motivation	Correlational	623	The findings suggest that societal and cultural elements, such as the high external expectations and the strong examination culture, may have an impact on the reciprocal relationships between students' motivation and cognitive engagement.	China

The literature consistently underscores the critical influence of motivation on students' mathematics performance, with intrinsic motivation identified as especially impactful. Alongside motivation, related psychological factors such as self-belief in one's abilities (self-efficacy), goal-setting tendencies, and a growth-oriented mindset have been linked to better academic outcomes in math. Moreover, environmental elements like a nurturing classroom atmosphere, constructive interactions with teachers, and encouragement from both peers and educators play a supportive role in sustaining student motivation. Collectively, these psychological and contextual influences foster greater student engagement, resilience, and achievement in mathematics.

Motivation in Learning Mathematics

McGrew (2008) defined academic motivation as a student's desire (approach, persistence and interest) regarding academic subjects when the students' competence is judged against a standard of performance or excellence. Yazici (2009) described motivation as a learning process that may not have a clear input or output. It is a driving force that influences learning behavior and can be categorized as either intrinsic (coming from within the learner) or extrinsic (influenced by external factors). Yazici also added that intrinsic motivation arises from an individual's internal drive or personal interest, while extrinsic motivation is based on organization level.

Motivation is described as one of the most important factors that affect learning process and success and that motivation can also be the power that stimulates a person to act in order to do something. Motivation is a fundamental recipe for academic success and plays an important role in learning because it greatly explains academic performance. The scholars explained that, Motivation initiates, sustains, and directs student behavior toward learning goals and determines where you are trying to go as explained by Gasco, Goni, & Villarroel (2014) and Schreglmann, (2018).

The researchers found a positive correlation between students' academic achievement and motivation based on their evaluations and investigations. According to Karadag (2017), studies on the impact of motivation on students' academic performance have shown that motivation does, in fact, affect students' performance because it is critical for students to succeed if their motivation is raised by igniting their positive emotions. Similarly, a study by Sugito and Fakhrudin (2024) demonstrated that elementary students taught mathematical concepts through music and melody-based methods showed an 87.3%

improvement in learning outcomes and a 92% increase in motivation compared to those taught via conventional methods.

These findings suggest that incorporating music into mathematics education can be an effective strategy to enhance student engagement and achievement.
Given that motivation is a significant component in conjunction with other elements that impact students' success in mathematics, it is necessary to look into how motivation affects secondary school mathematics instruction.

Discussion

This review aimed to explore how motivation influences the performance of secondary school students in mathematics. Motivation initiates, sustains, and directs student behavior toward learning goals and students' achievement in mathematics in secondary schools is motivation for learning the subject. The findings of this review indicate that in order to instill positive values toward their like and improved comprehension of mathematics, it is critical that this element be addressed sooner in primary school through senior school.

The findings of this review suggest to systematically analyze the review of literature on motivation in learning mathematics and mathematics achievement between 2018 until 2024. The findings of this review suggest that motivation in learning mathematics is related to mathematic achievement. The findings of this review suggest recent studies highlight that intrinsic and extrinsic motivation are the key factors influencing mathematics achievement. It highlights the importance of motivation in improving mathematics achievement.

The findings of this review show that Motivation in learning mathematics appears closely linked to both teacher and student characteristics. Although the measurement of motivation is different from other researchers, the result still shows the significant result with mathematics achievement. This review contributes by encouraging stakeholders to focus especially on intrinsic motivation as a way to improve students' mathematics achievement.

Findings

Bottom of Form

Student motivation and academic achievement are strongly correlated, according to a large body of research. Improved academic results are a result of motivated learners' propensity to interact with challenging content, use efficient study techniques, and ask for help when needed. A comprehensive analysis of motivation in relation to secondary school math performance. This review highlights the complex relationship between motivation and both internal (like students' self-efficacy, mindset, and goal orientation) and external (like teaching strategies, the classroom setting, and parental support) factors. For students' mathematics achievement to significantly improve, such a review would highlight the necessity of addressing both pedagogical and motivating factors.

Studies on students' mathematics achievement have been ongoing to help stakeholders address this issue. In particular, numerous studies have examined teacher-related factors influencing achievement (Reynolds & Walberg, 1992; Kitsantas et al., 2011; Woo & Henfield, 2016; Bhai & Horoi, 2019; Blömeke & Olsen, 2019; Burns et al., 2019; Zhou et al., 2020).

The results showed that the academic performance of students taught using motivation vary significantly from that of students taught without motivation. Recent studies indicate that student motivation may be the most significant factor influencing mathematics achievement, offering clearer guidance for stakeholders aiming to enhance student performance. Through a systematic review, motivation in learning mathematics emerged as the primary factor associated with students' achievement in the subject. Based on this finding, the review presents two recommendations for future research. First, researchers are encouraged to utilize academic databases and search platforms such as EBSCOhost, Emerald Insight, JSTOR, and Google Scholar. Students in schools where intrinsic motivation was encouraged performed better.

The results showed that students do better academically when they are motivated to learn mathematics and where teaching materials are chosen and used appropriately. It is evident that there are insufficient teaching resources to support mathematics instruction, especially in senior secondary schools in developing nations. Research indicates that issues connected with mathematics education at the senior secondary level can be addressed with the use of relevant media materials and information and communication technology (ICT). More significantly, by making mathematical concepts more approachable, dynamic, and interesting, these resources can raise student motivation. The use of ICT to expose students to dynamic visualizations, simulations, and real-world applications frequently boosts their enthusiasm and confidence in mathematics, which in turn improves their performance.

As the world becomes more digitally connected, the utilization of educational resources can greatly aid in making mathematics engaging for students. Effective motivation in senior secondary schools was shown to be influenced by the fact that some students perform poorly on examinations not because they lack intelligence but rather because they lack a little push or motivation. The researchers found a positive correlation between students' academic achievement and motivation based on their investigations and ratings. According to the study, students' performance in mathematics is influenced by their motivation to master the subject.

Future Direction

Most of the articles reviewed in this study are quantitative. Out of 29 studies reviewed, 27 used quantitative methods, while only one used qualitative and one used mixed-methods. As Merriam (2009) suggests, qualitative research allows for deeper exploration and understanding, while mixed-methods can offer a more comprehensive explanation (Creswell & Clark, 2018).

The finding has significant arrangement suggestions. The contribution of teacher factors to mathematics achievement needs to be explored in more depth, especially the involvement of students and teachers.

Due to the current shortage of robust studies examining the impact of teacher-related factors especially those that influence student motivation on mathematics achievement, further research in this area is strongly encouraged. A deeper understanding of how teachers can effectively cultivate and maintain student motivation may provide meaningful contributions to enhancing mathematics learning outcomes and refining instructional approaches.

Conclusion

In conclusion, students' motivation significantly influences how well they succeed in mathematics. It affects how students approach problems, interact with mathematical content, and persevere when things go tough. Extrinsic motivation, which is fueled by rewards or recognition from outside sources, and intrinsic motivation, which occurs when students pursue mathematics because they find it interesting or enjoyable, are two motivational elements that have a major impact on learning results. Studies repeatedly demonstrate that pupils who are genuinely motivated are more likely to solve problems, show perseverance when faced with challenging assignments, and gain a deeper comprehension of mathematical topics.

Additionally, learning motivation influences students' attitudes toward mathematics, their self-confidence, and their willingness to take academic risks in addition to being connected to individual accomplishment. Motivated students are more likely to set goals, take charge of their education, and embrace a growth mindset all of which are critical for success in mathematics. Teachers can enhance motivation by creating a good learning environment that fosters both internal and external motivation by utilizing strategies like goal-setting, offering constructive criticism, and highlighting the real-world applications of mathematics. Nonetheless, it is critical to acknowledge that motivation is a complex concept impacted by a range of internal and external elements, including personal experiences, teacher support, and cultural background.

In the end, a key strategy for improving student performance in mathematics is to create a supportive and encouraging environment. Motivated students are not only more likely to succeed in mathematics but also more likely to develop a lasting interest in the subject.

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