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Efforts to Improve Student Learning Motivation in Mathematics Learning by Using the Realistic Mathematics Education Approach at MIN 1 Banda Aceh

Azmil Hasan Lubis ✉, Universitas Islam Negeri Ar-Raniry Banda Aceh, Indonesia

✉ *azmilhasan.lubis@ar-raniry.ac.id*

Abstract: This study aims to explore the effectiveness of the Realistic Mathematics Education (RME) approach in enhancing student learning motivation in mathematics at MIN 1 Banda Aceh. Low motivation among students in mathematics learning has been a persistent challenge, often resulting in decreased engagement and suboptimal learning outcomes. To address this issue, a Classroom Action Research (CAR) was conducted over two cycles, each consisting of planning, action, observation, and reflection phases. The participants were 28 fourth-grade students who exhibited varying levels of interest and performance in mathematics. The RME approach, which emphasizes contextual learning and the use of real-life situations to make abstract mathematical concepts more relatable, was implemented through a series of structured learning activities. Data collection methods included observation, student motivation questionnaires, interviews, and documentation. The results demonstrated a significant increase in students' motivation, as evidenced by higher participation rates, improved attitudes towards mathematics, and greater enthusiasm during classroom discussions and group activities. Quantitative analysis showed an increase in the average motivation score from 63.2% in the pre-cycle to 78.5% in the first cycle, and further to 89.4% in the second cycle. Qualitative findings supported these results, revealing that students were more actively involved, collaborative, and confident in solving mathematical problems when learning was linked to real-world contexts. In conclusion, the Realistic Mathematics Education approach proved to be an effective pedagogical strategy for improving student learning motivation in mathematics. It is recommended that educators adopt RME principles to create meaningful and engaging learning experiences that resonate with students' everyday lives. Future research may explore the long-term impact of RME on students' academic achievement and its adaptability across different educational settings.

Keywords: Realistic Mathematics Education, learning motivation, mathematics learning.

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INTRODUCTION

Mathematics plays a vital role in shaping logical thinking, problem-solving skills, and analytical reasoning among students. As a core subject in the school curriculum, mathematics is essential for academic achievement and future career opportunities. However, despite its importance, many students at the elementary level continue to struggle with learning mathematics, often due to low learning motivation (Schoenfeld, 2018).

Learning motivation is one of the key factors influencing students' academic success. It determines their level of engagement, persistence, and enthusiasm in the learning

process. Students with high motivation tend to achieve better academic outcomes compared to those with low motivation (Ryan & Deci, 2020). Unfortunately, in many Indonesian elementary schools, including MIN 1 Banda Aceh, students exhibit a lack of interest and enthusiasm when learning mathematics. Traditional teaching methods that focus on rote memorization and abstract problem-solving often contribute to students' negative perceptions of mathematics. These conventional approaches fail to relate mathematical concepts to students' real-life experiences, resulting in decreased motivation and disengagement (Wijaya et al., 2015). Consequently, there is a growing need for instructional strategies that can foster a meaningful and engaging learning environment.

The Realistic Mathematics Education (RME) approach has emerged as a promising alternative for improving students' motivation in mathematics learning. Developed in the Netherlands and later adopted in various educational systems worldwide, RME focuses on contextual learning, where mathematical problems are presented in realistic situations familiar to students (Gravemeijer & van Galen, 2016). By connecting mathematical concepts with real-world contexts, RME helps students understand abstract ideas in a more meaningful way. This approach encourages active learning, collaboration, and problem-solving, which are essential components for fostering motivation (Suryanto et al., 2022). Several studies have shown that RME can significantly improve students' engagement and academic performance in mathematics (Putri & Zulkardi, 2021). Despite the increasing recognition of RME's benefits, there remains a gap in its application within the context of Indonesian Islamic primary schools, particularly in Aceh. Most existing studies focus on urban schools or general public schools, with limited exploration in madrasah institutions, where the learning culture and student characteristics may differ (Nurhadi et al., 2020).

Moreover, previous research has primarily emphasized the impact of RME on cognitive learning outcomes, with less attention given to affective domains such as learning motivation. While RME is theoretically capable of enhancing motivation, empirical evidence in this area is still relatively scarce, especially at the elementary school level in Indonesia (Mulyana & Prasetyo, 2019). This study addresses this gap by exploring the implementation of the RME approach to improve learning motivation in mathematics among fourth-grade students at MIN 1 Banda Aceh. The choice of this location adds value to the study by providing insights into the challenges and opportunities of implementing RME in a religious-based school setting.

The novelty of this research lies in its focus on the affective domain of student motivation in the context of RME, an area that remains underexplored in existing literature. By highlighting how RME can influence students' willingness to learn and engage with mathematics, this study contributes to the development of holistic instructional practices that cater to both cognitive and emotional aspects of learning. Furthermore, this study adopts a classroom action research design that allows for iterative reflection and improvement throughout the intervention process. This methodological approach provides practical insights for educators aiming to implement RME effectively within their own classrooms (Kemmis, McTaggart, & Nixon, 2014).

The findings of this research are expected to inform not only local educators in Aceh but also education policymakers and curriculum developers at a broader level. As motivation is closely linked to long-term learning success, understanding how to nurture it through appropriate pedagogical strategies is essential. In addition, the study contributes to the global discourse on mathematics education by offering empirical data from a Southeast Asian Islamic school context, which is often underrepresented in international research literature. This adds a valuable cross-cultural perspective to the field of mathematics education (Zulkardi et al., 2022). Through the use of real-life contexts in teaching, students are encouraged to view mathematics as a useful and relevant discipline, rather than an abstract and intimidating subject. This relevance plays a crucial role in enhancing their intrinsic motivation to learn (Boaler, 2016). RME also promotes student-

centered learning, where learners are actively involved in constructing their own understanding. Such autonomy and active engagement have been shown to significantly influence motivation and positive learning behaviors (Deci & Ryan, 2017).

This research is also timely, considering the increasing emphasis on 21st-century skills, which require students to think critically, collaborate effectively, and solve complex problems. The RME approach aligns well with these educational demands by fostering a more interactive and meaningful learning environment (OECD, 2018). By exploring the application of RME in a real classroom setting, this study bridges the gap between theory and practice. It demonstrates how educational innovations can be tailored to specific cultural and institutional contexts, thereby increasing their effectiveness and sustainability.

This introduction has outlined the importance of mathematics education, the challenges of student motivation, the potential of the RME approach, and the research gaps that this study seeks to address. The focus on a madrasah setting and the affective domain of learning motivation adds both theoretical and practical value to the existing body of knowledge. This study aims to provide a nuanced understanding of how RME can serve as an effective strategy to enhance student learning motivation in mathematics, especially within culturally distinct educational environments such as MIN 1 Banda Aceh.

METHODS

This research employed a Classroom Action Research (CAR) design, which is particularly suitable for addressing practical educational problems and improving instructional practices in real-time classroom settings. The approach followed the model proposed by Kemmis and McTaggart (2014), which involves a cyclical process comprising four stages: planning, action, observation, and reflection. This cyclical process was implemented in two cycles to ensure continuous improvement and to measure the effectiveness of the intervention accurately.

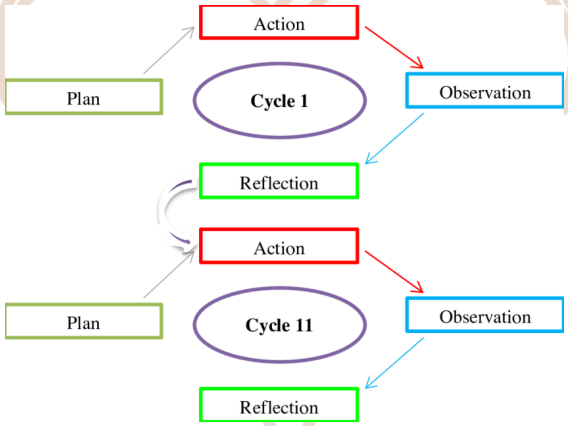

Figure 1. *Research Design*

The study was conducted at MIN 1 Banda Aceh, a public Islamic elementary school located in Banda Aceh, Indonesia. The participants were 28 fourth-grade students, aged between 9 and 10 years old, consisting of 13 boys and 15 girls. The selection of participants was based on the preliminary observation results that indicated low learning motivation in mathematics, which affected student participation and performance in class.

The intervention applied in this study was the Realistic Mathematics Education (RME) approach. The learning process was designed around real-life situations relevant to the students' daily experiences, aiming to make abstract mathematical concepts more tangible and understandable. Learning materials, teaching strategies, and student activities were all adapted to align with the core principles of RME, such as using contextual problems, progressive mathematization, and student contributions.

Data collection was conducted using multiple instruments to ensure the validity and reliability of findings. These instruments included observation sheets, student motivation questionnaires, interviews, and documentation. Observations were used to monitor student engagement and behavioral indicators of motivation during the learning process. The motivation questionnaire was developed based on indicators of intrinsic and extrinsic motivation, including interest, enjoyment, effort, and perceived value of learning mathematics.

Interviews were conducted with selected students and the classroom teacher to obtain qualitative insights into students' learning experiences and perceptions of the RME approach. Documentation, including student worksheets and photographs of classroom activities, was used to support the triangulation of data.

Data analysis was carried out both quantitatively and qualitatively. Quantitative data from the motivation questionnaires were analyzed using descriptive statistics to identify changes in student motivation between the pre-cycle, Cycle I, and Cycle II. The analysis focused on the percentage of students showing high, moderate, and low levels of motivation. Qualitative data from observations, interviews, and documentation were analyzed using thematic analysis to identify patterns and emerging themes related to students' motivation and engagement.

The success criteria of the research were determined by the increase in students' motivation scores and observed behavioral improvements in the classroom. The research was considered successful if at least 85% of students showed high or improved motivation by the end of Cycle II. Reflective discussions were held at the end of each cycle to evaluate the outcomes and plan improvements for the next cycle.

Ethical considerations were taken into account throughout the research process. Permissions were obtained from the school principal and classroom teacher. Students and their parents were informed about the purpose and procedures of the research, and participation was voluntary. All data were kept confidential and used solely for academic purposes. Through this methodological framework, the study aimed to obtain a comprehensive understanding of how the Realistic Mathematics Education approach influences students' learning motivation and to provide practical recommendations for enhancing mathematics instruction in similar educational contexts.

RESULTS

The implementation of the Realistic Mathematics Education (RME) approach was conducted over two cycles of classroom action research. The focus was to enhance student learning motivation in mathematics, which had previously been identified as relatively low based on initial observations and pre-cycle assessments. The results from both quantitative and qualitative data collection methods provide a comprehensive overview of the progress made throughout the study.

In the pre-cycle phase, baseline data were gathered through a student motivation questionnaire and classroom observations. The initial results indicated that only 7 out of 28 students (25%) demonstrated high levels of motivation toward learning mathematics. The majority of students, 16 (57.1%), were categorized as having moderate motivation, while the remaining 5 students (17.9%) exhibited low motivation. This was further supported by classroom observations, which revealed low participation during lessons, minimal student-teacher interaction, and a general lack of enthusiasm for mathematics-related tasks.

Cycle I began with the integration of RME principles into daily mathematics instruction. Learning activities were contextualized using familiar real-life problems, such as calculating total costs while shopping at the market or measuring distances between local landmarks. At the end of Cycle I, motivation questionnaires and observational assessments were administered again. Results showed a notable improvement: 12

students (42.9%) now exhibited high motivation, 13 students (46.4%) were in the moderate category, and only 3 students (10.7%) remained at a low level of motivation.

The average motivation score rose from 63.2% in the pre-cycle to 78.5% at the end of Cycle I. Observation data confirmed these improvements, as more students actively participated in group discussions, demonstrated increased confidence in solving mathematical problems, and showed greater persistence in completing tasks. The teacher also reported that students began to ask more questions and showed curiosity about how mathematics applied to everyday life.

Despite these positive developments, reflective analysis identified several areas for further enhancement. Some students still struggled to fully engage, especially when problems lacked sufficient personal relevance. Additionally, time management during collaborative activities was observed to be inefficient in certain groups. These insights informed the planning of Cycle II, where more localized and personalized contexts were introduced, such as problems involving family budgeting or neighborhood games that involved counting or measurement.

In Cycle II, learning activities were further refined to include more student-generated contexts and greater use of visual aids and manipulatives. For example, students were asked to design simple floor plans for their homes using measurement concepts, or to calculate the cost of planning a class event using addition and multiplication. These adjustments appeared to significantly enhance students' emotional connection to the content.

The results from Cycle II showed a substantial increase in student motivation. By the end of the cycle, 23 students (82.1%) were classified as highly motivated, while 5 students (17.9%) were categorized as moderately motivated. Notably, none of the students remained in the low motivation category. The average motivation score increased further to 89.4%, surpassing the predetermined success criterion of 85%.

Qualitative findings from interviews also corroborated the quantitative data. Students reported that they found mathematics more enjoyable and easier to understand when lessons were connected to their everyday experiences. One student remarked, “Now I know why we need to learn math—it helps me when I go shopping with my mom.” Another student mentioned that group work helped them feel more confident because they could learn from their peers and share ideas.

Teacher feedback also emphasized the effectiveness of RME in fostering student-centered learning. The teacher observed that students were more proactive, collaborative, and expressive in class. Moreover, the classroom atmosphere became more dynamic and interactive, with students more frequently initiating discussions and proposing their own problem-solving strategies.

Documentation in the form of student worksheets and photographs showed greater completeness and accuracy in student responses, as well as creative representations of problem-solving processes. Students were able to justify their answers and articulate the reasoning behind their solutions—an indicator of deep learning and internal motivation.

The thematic analysis of observational and interview data revealed several recurring themes that explain the rise in motivation: increased relevance of content, greater student autonomy, improved peer collaboration, and enhanced teacher support. These elements align with Deci and Ryan’s (2017) Self-Determination Theory, which posits that autonomy, competence, and relatedness are critical to fostering intrinsic motivation.

Comparing the pre-cycle and final cycle data provides strong evidence of the impact of RME. Student motivation not only improved numerically but also qualitatively, as evidenced by changes in behavior, attitude, and self-expression. The difference in classroom dynamics before and after the intervention was clearly noticeable, with the classroom evolving from a passive environment to an active learning community.

It is important to note that the success of RME implementation relied heavily on the teacher's ability to design meaningful contexts and facilitate active learning. The training

and adaptability of the teacher played a crucial role in the effectiveness of the intervention. Therefore, professional development in contextual lesson planning is recommended to support broader application of RME.

The results of this study are consistent with previous research showing that RME can positively affect student attitudes and engagement in mathematics (Putri & Zulkardi, 2021; Suryanto et al., 2022). However, this study extends the existing literature by providing specific evidence from a madrasah-based primary school, thereby offering new insights into how RME can be adapted to suit religious and cultural educational settings.

Furthermore, this study contributes to the limited body of work focusing specifically on motivation as a primary outcome of RME. Most studies in this area have traditionally emphasized cognitive achievement, while affective outcomes like motivation have received less attention. By shifting focus toward motivation, this study fills an important research gap and highlights the potential of RME to support holistic learning.

The improvement in students' learning motivation observed throughout this study underscores the transformative potential of RME in elementary education. It not only enhances understanding of mathematical concepts but also cultivates positive learning attitudes, thereby supporting long-term academic success.

The implementation of the Realistic Mathematics Education approach at MIN 1 Banda Aceh successfully improved student learning motivation in mathematics. The approach proved effective in increasing both the quantitative and qualitative dimensions of motivation, supporting its use as a valuable pedagogical strategy in similar educational contexts.

DISCUSSION

The findings of this study reveal that the implementation of the Realistic Mathematics Education (RME) approach significantly improved student learning motivation in mathematics. This result aligns with the theoretical foundations of RME, which emphasize the use of real-life contexts to make mathematics more meaningful and engaging for students (Gravemeijer & van Galen, 2016). By connecting abstract mathematical concepts to familiar and concrete experiences, students were able to see the relevance of mathematics in their everyday lives, which contributed to increased motivation.

This study supports prior research demonstrating that motivation can be enhanced when students perceive the subject matter as useful and applicable to their daily experiences. According to Boaler (2016), when mathematics is taught through practical, relatable problems, students are more likely to engage deeply with the content and persist in the face of challenges. The use of contextual problems in this study, such as calculating expenses or measuring household objects, mirrors these principles and yielded similar positive outcomes.

The increase in student motivation observed in this study is consistent with Deci and Ryan's Self-Determination Theory (2017), which posits that intrinsic motivation is fostered when learners experience autonomy, competence, and relatedness. RME inherently supports these needs by allowing students to work collaboratively, contribute their own problem-solving strategies, and receive constructive feedback in a supportive environment. The learning process becomes more student-centered, which enhances their sense of ownership and responsibility.

Moreover, the improvement in student behavior—such as increased participation, initiative in group discussions, and the ability to explain their reasoning—indicates a shift not only in motivation but also in the depth of cognitive engagement. This reinforces the idea that motivation and achievement are interrelated, as motivated students are more likely to exert effort and perform better academically (Schunk, Pintrich, & Meece, 2014).

Previous studies have shown that RME can improve students' problem-solving skills and mathematical understanding (Zulkardi et al., 2022; Suryanto et al., 2022). However, this study contributes a new perspective by focusing on motivation as the primary

outcome. The findings suggest that affective domains should be given more attention in mathematics education research, particularly in culturally specific contexts such as Islamic schools in Indonesia.

The context of this research—an Islamic elementary school in Aceh—adds an important cultural dimension to the discussion. Many educational innovations struggle to be effectively implemented in religious-based schools due to differences in curriculum priorities and instructional styles. However, the success of RME in this setting suggests that with thoughtful adaptation, student-centered approaches can thrive even in traditional educational environments (Husna et al., 2021).

This study also affirms the importance of teacher involvement in the success of educational interventions. The teacher's ability to create relevant problems, facilitate discussions, and reflect on the learning process played a critical role in the outcome. As noted by Widodo and Riandi (2020), professional development and pedagogical flexibility are key to effective implementation of new instructional models.

The findings echo research by Putri and Zulkardi (2021), who found that students were more motivated and performed better when mathematics instruction used local cultural contexts. In this study, the use of familiar settings such as local markets or community events helped students connect emotionally with the material, thereby reinforcing their intrinsic motivation to learn.

It is also worth noting that students' enjoyment and curiosity about mathematics increased during the RME implementation. Enjoyment is a vital component of sustained motivation, as suggested by Pekrun et al. (2017), who argue that positive emotions during learning contribute to long-term academic engagement and performance. Students in this study were observed to approach mathematical problems with enthusiasm, which contrasts sharply with their pre-cycle behaviors.

The gradual shift from teacher-centered to student-centered learning contributed to the development of students' autonomy, which is a fundamental aspect of motivation. As described by Ryan and Deci (2020), learners who feel autonomous are more likely to take initiative, persist in learning tasks, and achieve higher levels of understanding. The RME model supported this shift by allowing students to generate ideas, make decisions, and explore solutions collaboratively.

Furthermore, the collaborative nature of RME facilitated peer learning, which had a positive effect on students' motivation. According to Vygotsky's theory of social constructivism, learning occurs through social interaction and scaffolding provided by peers or teachers. When students work together, they not only develop cognitive skills but also feel a greater sense of belonging and support (Zhao & Kuh, 2018).

This study highlights that mathematical motivation is not a fixed trait but can be nurtured through appropriate instructional strategies. The dynamic nature of student motivation observed across the research cycles demonstrates that educators play a crucial role in shaping students' attitudes toward mathematics. This challenges the perception that motivation is solely an internal characteristic, emphasizing instead the significance of the learning environment.

In addition, the integration of culturally relevant examples within the RME framework proved to be a powerful tool in promoting engagement. As noted by Gay (2018), culturally responsive teaching bridges the gap between home and school cultures, thereby enhancing the relevance and accessibility of academic content. The ability of RME to accommodate local contexts supports its adaptability and effectiveness across diverse educational settings.

The use of multiple data collection methods in this study—questionnaires, observations, interviews, and documentation—enhanced the validity and reliability of the findings. This methodological triangulation allowed for a nuanced understanding of both behavioral and emotional dimensions of student motivation. Such comprehensive analysis is critical in educational research, as motivation is a multifaceted construct that cannot be fully captured by quantitative measures alone (Creswell & Poth, 2018).

In sum, the findings of this study provide strong evidence for the effectiveness of the RME approach in improving student learning motivation in mathematics. The integration of real-life contexts, student autonomy, collaborative learning, and cultural relevance collectively contributed to a learning environment that was both intellectually stimulating and emotionally supportive. These findings have significant implications for curriculum development, teacher training, and educational policy in Indonesia and beyond.

CONCLUSION

The findings of this study demonstrate that the implementation of the Realistic Mathematics Education (RME) approach significantly enhanced student learning motivation in mathematics at MIN 1 Banda Aceh. Through the integration of real-life, contextual problems, increased student autonomy, and collaborative learning activities, students became more engaged, confident, and persistent in their mathematical learning processes. The improvement was evident both quantitatively, through increased motivation scores, and qualitatively, through observable behavioral and attitudinal changes in the classroom. These results suggest that RME not only supports conceptual understanding but also plays a critical role in fostering intrinsic motivation, particularly in culturally grounded educational settings. Therefore, the RME approach holds strong potential as an effective pedagogical strategy for improving both the cognitive and affective outcomes of students in mathematics education.

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