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Exploration of the Role of Real Context in Developing Mathematical Understanding Through the Realistic Mathematics Education Approach

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Abstract

This study explores the role of real-world contexts in developing students' mathematical understanding through the Realistic Mathematics Education (RME) approach at Gunung Sekar Elementary School, Sampang. The background of this research lies in the low mathematical comprehension of elementary students, largely due to abstract, teacher-centered instruction. Using a qualitative exploratory case study, data were collected through classroom observations, interviews, and documentation involving 25 sixth-grade students, with six selected for in-depth analysis. The findings revealed that implementing RME by introducing contextual problems such as daily life situations involving division, measurement, and fractions significantly enhanced students' conceptual understanding, engagement, and confidence in mathematics learning. Students demonstrated improvements in explaining concepts, using multiple representations, and applying mathematical ideas to new contexts. Moreover, the learning process promoted active participation, collaboration, and critical thinking. Teachers transitioned from information providers to facilitators who guided exploration and reflection. The study concludes that the integration of real contexts within RME makes abstract concepts more meaningful and accessible to students, thereby improving both cognitive and affective learning outcomes. These results emphasize the potential of RME as an effective pedagogical strategy to strengthen mathematical literacy and cultivate positive attitudes toward mathematics in Indonesian elementary education.

Introduction

Mathematics is one of the basic subjects taught in elementary schools with the aim of developing logical, analytical, and critical thinking skills in students (Jamil et al., 2024; Sarnoko et al., 2024; Yu et al., 2024). In many countries, including Indonesia, learning mathematics in elementary schools often presents challenges for both students and educators (Rahmaini & Chandra, 2024a). However, mathematics has a very vital role in students' academic and cognitive development, as well as being a foundation for mastering science and technology in the future (Yolanita & Ruswendi, 2024). Thus, effective and comprehensive mathematics learning in elementary schools is essential to ensure students' readiness to face the challenges of higher education. Mathematics learning in elementary schools plays a crucial role in developing the foundations of logical, analytical, and systematic thinking skills in students (Siswanto & Hanama, 2024; Sarnoko et al., 2024; Zakirovna & Shokhabbos, 2025). Mathematics does not only function as arithmetic, but also as a tool to train problem-solving skills, recognize patterns, and develop critical thinking skills from an early age (Rahmaini & Chandra, 2024b). In the context of primary education, mathematics learning must be designed

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in an interesting and contextual way to suit the level of cognitive development of children (Misqa et al., 2024; Arsyad et al., 2024; Wibowo et al., 2025).

Mathematics learning in elementary schools in Indonesia is still faced with various complex problems, such as low understanding of basic mathematical concepts by students (Utami & Setyawati, 2022; Sarnoko et al., 2024; Agusfianuddin et al., 2024). The dominance of conventional teaching methods that tend to be teacher-centered and abstract (Ministry of Education and Culture, 2023). PISA 2022 data noted that85%Indonesian 15-year-old students fail to achieve the minimum level of competency in mathematics, with one contributing factor being the lack of connection between the material and real-life contexts (OECD, 2023). Previous research also revealed that 72% of elementary school students have difficulty understanding fractions and geometry operations due to learning that relies too much on procedural memorization (Fadhilah Amir et al., 2022). Furthermore, students' disinterest in mathematics is reflected in a national survey which shows that only 34% of elementary school students like this subject, which has an impact on the low average score of the National Examination in mathematics (51.2 on a scale of 100) at that level (National Education Standards Agency, 2023).

Furthermore, based on pre-research observations, the conditions of mathematics learning in Elementary SchoolsMount Sekar SampangThere are still suboptimal learning completion scores. Only 38% of students achieved a passing score, while 62% of students achieved a score below it. This indicates a significant gap in mathematics learning outcomes among students. Factors that may contribute to this low completion rate include inadequate learning methods, a lack of understanding of basic mathematical concepts, and a lack of student motivation and engagement in the learning process (Safari & Wicaksono, 2024; Emelda et al., 2024; Kikomelo, 2024). For this reason, there needs to be improvement efforts that involve a more innovative and responsive learning approach to students' needs, as well as the implementation of strategies that can increase their interest and understanding of mathematics subjects.

As a solution to overcome existing problems, this study proposes the application of the Realistic Mathematics Education (RME) approach, which emphasizes the role of real-world contexts in elementary school mathematics learning (Amalia et al., 2024; Siregar et al., 2025; Himmi et al., 2025). RME focuses on developing students' mathematical understanding through learning experiences directly related to their daily lives (Widodo A et al., 2023; Susanti, 2025; Koerunnisa et al., 2025; Lubis, 2025). By using relevant and contextual problems, students can more easily connect the mathematical concepts they learn to the real world (Hakim et al., 2024; Utami et al., 2024; Yusari et al., 2025). This approach allows students to investigate and solve problems in situations that are meaningful to them, rather than simply applying formulas taught without in-depth understanding (Ardiniawan et al., 2023; Rahmah & Lubis, 2024; Sarnoko et al., 2024; Fardian et al., 2025). In its implementation, teachers will utilize various contexts or situations close to students' lives, such as everyday problems involving calculation, measurement, and data management. With this approach, students are expected to develop mathematical skills naturally and build a stronger understanding of mathematical concepts. Furthermore, the use of RME is expected to increase students' motivation and interest in learning mathematics, as they experience the direct benefits of what they learn in contexts that are relevant and useful to their lives (Siswanto et al., 2024; Hayati et al., 2025; Arifin & Efriani, 2025).

The Realistic Mathematics Education (RME) approach emerged as a potential solution to this problem. As a learning philosophy, RME emphasizes the use of real-world contexts as a starting point for building mathematical understanding (Harahap & Sari, 2023). Several

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previous studies have proven the effectiveness of RME in improving mathematics learning outcomes (Palinussa et al., 2021). However, its implementation in Indonesia remains limited to theoretical aspects without in-depth exploration of how real-world contexts relevant to local culture can be optimally utilized. Furthermore, no research has comprehensively investigated the transition process of students' understanding from the concrete to the abstract level through this approach in the Indonesian context.

This study aims to fill this gap by deeply exploring the role of real-world contexts in developing elementary school students' mathematical understanding through the RME approach. This study not only tests the effectiveness of RME, but also investigates: (1) the types of real-world contexts that are most effective in building conceptual understanding, (2) the mental processes that occur when students transform knowledge from concrete experiences to abstract understanding, and (3) the factors that influence the success of RME implementation in elementary school mathematics classes.

This research offers novelty through an in-depth exploration of the implementation of Realistic Mathematics Education (RME) contextualized with the cultural and real-life environment of elementary school students in Indonesia (Fauzi et al., 2024). In contrast to previous research that generally focuses on the effectiveness of RME in general, this study specifically investigates how the selection and presentation of real contexts that are relevant to students' daily lives such as traditional activities, local games, or socio-cultural situations can strengthen the foundation of understanding mathematical concepts (Nurjanah et al., 2025). In addition, this study develops a holistic evaluation framework, not only measuring cognitive learning outcomes, but also mapping students' mental processes during interactions with contextual problems, thereby providing new insights into the mechanisms of RME-based learning in the Indonesian context.

The second novelty lies in the integration of a qualitative-ethnographic approach to analyze classroom dynamics during the implementation of RME. This study not only tests whether RME works but also answers how and why certain contexts are more effective in building mathematical understanding. By recording teacher-student interactions, emotional responses, and emerging problem-solving strategies, this study produces an RME adaptation model that is sensitive to the characteristics of mathematics learning in Indonesia. These findings are expected to enrich the repertoire of elementary school mathematics pedagogy with a local perspective, while also refining RME theory, which has been primarily developed in Western contexts.

Thus, this research is expected to provide a deeper understanding of the application of the Realistic Mathematics Education (RME) approach in mathematics learning in elementary schools. By exploring the role of real-world contexts in developing mathematical understanding, it is hoped that effective solutions can be found to address challenges faced in mathematics learning and contribute to improving the quality of mathematics education at the elementary level, particularly in Indonesia.

Methods

Research Design

This paper followed a qualitative approach, which was based on an exploratory case study. The reasoning behind the choice of this design was to study the phenomenon of Realistic Mathematics Education in its natural forms in the classroom and hence preventing reductive variableization or independent measurements. The exploratory orientation allowed the researcher to be open to the learning environment, and it helped to identify subtle interactions,

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understanding changes, and how the real-world situations silently influenced how students thought mathematically. The observation of events in the field enabled the researcher to develop a supranarrative portrait of the learning processes not only in terms of observable instructional processes but also the implicit cognitive and affective aspects that traditionally goes unnoticed in more formal research methodologies.

The case study design provided the flexibility to establish the realities of participants without compromising the richness to investigate how the students made a sense of mathematical concepts using contextual experiences. Instead of trying to untangle the phenomenon under study out of its educational context, the study accepted the complexity of the classroom, in which learning will always be a result of intertwined social, cultural and cognitive forces. This methodological decision was in line with the main purpose of the study and investigation, which was to seek the complexity of relation between real-life scenario and mathematical thought as perceived by the students in their daily school activities.

Case Study Focus

The case concentrated on a sixth-grade mathematics classroom, which was considered to be a relevant location to study the contextual learning manifestation. At this stage of learning, students are at a transitional stage whereby they are moving out of their concrete operational thought process to more abstract thinking. This constructive stance made mathematical tasks within the Realistic Mathematics Education paradigm specifically relevant since mathematical tasks require the students to interpret representations, create meaning out of familiar situations, and slowly translate experience into abstract thinking. This choice of classroom therefore placed the study in the setting where the interaction between the real-life context and the abstraction of mathematics could be dynamically observed in a clear and deep manner.

The school setting offered a natural setting where the application of contextual problems could be recorded during the learning procedure. This interest enabled the researcher to follow how the engagements of students developed on the basis of initial interest, through prior manipulation of representations, up to the final points of understanding when mathematical concepts started to be more understandable. The focus on one, unified learning community made the study provide an integrated representation of how instructional practices, classroom climate, and student attitudes converged during learning mathematics based on real-life situations.

Participants

The sample group consisted of twenty five sixth grade students, six of whom were sampled carefully and intensive data generation conducted on them. These six students were a continuum of the levels of achievement, i.e., high, medium, and low, therefore enabling the study to depict a representation of diverse learning patterns in a common instructional setting. The purposive sampling approach also guaranteed the respect of the objectives of the study as opposed to random selection. It was an attempt not to generalize statistically but to form a profound sense of understanding the process of contextual mathematical activities in various learners.

The choice of the sixth-grade students was also informed by their willingness to approach mathematical problems in contextual ways in a reflective manner. At this level, the students have already gone through some basic operations, fractions and introductory geometry and are now starting to begin the reasoning that goes beyond procedural repetition. The stage of their development together with the enabling learning environment that the school accorded them created the best environment to study how contextual tasks could foster conceptual

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understanding. This eagerness of the school to make possible the study provided smooth observations and interviews that ensured that the researcher developed trust with the students and that their thoughts were recorded with enhanced sensitivity.

Data Collection Techniques

Systematic classroom observations, semi-structured interviews, and documentary analysis were used in the data collection. The latter methodological decisions were informed by their ability to provide complementary levels of knowledge about the phenomenon being studied. Immediacy of instructional interactions and the way learners reacted to the contextualized tasks was observed data. Semi-structured interviews provided the respondents with a platform to express the ideas that otherwise would not be expressed in the classroom. Documentary analysis produced solid artefacts of student production, which allowed a subtle exploration of the way representational practices changed over time. Taken together, these methods converged to create a holistic and balanced description of how the actual contexts do intrude on mathematical learning.

The observations were conducted throughout the instructional gatherings, which gave the investigator a chance to record the activities of the students as they occurred naturally. Cases of hesitation, excitation, confusion or clarity were salient to decode the manner in which the participants created meaning of the given problems. The resultant observations records highlighted how students interacted with materials, their peers and the teacher who made efforts to convert real life situations into mathematical representation.

Semi-structured interviews were used to explore the reasoning of the probe participants in a deeper manner. The form promoted the open description of experiences and an artificial guidance of the conversation in the direction of the phenomena relevant to the goals of the research. These discussions helped the researcher to understand the way in which learners were able to make sense of contextual issues, what strategies they used, and the way they viewed mathematics placed in the context of everyday life. These storytelling descriptions provided a deeper and richer insight into the observational data by adding emotional content and intellectual complexity.

The analytical approach of documentation increased the investigation by providing concrete sample student work. Artefacts such as worksheets, graphical representations, written explications and others traced the path of reasoning and showed how the understanding of learners gradually structured. Such aggregation of data points made the interpretations carried out in the course of the study to have a strong anchorage in multidimensional evidence.

Data Analysis

This line of analysis followed the steps of qualitative inquiry in a sequential manner including reduction, display, and conclusion building. During the first stage, the data were summarized into substantive units, which summarized the core experiences relating to the conceptual understanding of the participants. Field notes, interview verbatim, and artefacts were cyclically explored, allowing crystallizing emergent patterns. This initial phase required close judgment to retain the necessary knowledge and remove the unnecessary information.

The investigator then created displays after the data structuring that elucidated relational processes between nascent concepts. Such visualization helped to make learners understand how real-life experiences were correlated with mathematical explanation and how their arguments have evolved throughout the instructional continuum. Thematic threads related to explanation, representation, application and conceptual linkage were mapped with a systematized rearranged data.

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The final step involved the development of interpretations that did not betray the lived experiences of participants but went on to more general discourses on Realistic Mathematics Education. Credibility was ensured by the triangulation of the conclusions against the corpus and refining the conclusions repeatedly. This analytical development allowed the study to describe how real world situations help in the construction of mathematical knowledge in a manner that is significant and based on the realities of classroom practice.

Results and Discussion

Realistic Mathematics Education implementation was carried out in three classroom meetings and the dynamics which were created in the sessions indicated how students slowly transformed their concept of fractions. To start with, numerous participants were hesitant especially where the lessons were presented with more narratives in everyday life than the blunt explanations. Their expressions however became softened as the activities were carried out. Others leaned forward, some others whispered to their colleagues and some of them smiled when they realized that they are going through what they are seeing. This familiarity made a point of contact, making mathematical concepts approachable and less far.

The initial session set the pace as it introduced a simple situation of a cake that will be equally divided among four members of the family. Highly cognitively able students quickly paraphrased the issue and gave the division of the entire as it should be. The middle-ability ones needed the guide of illustrative figures by the teacher before they would be comfortable in expressing themselves. Less able students were not sure until they held the paper circles physically, and started to fold them. The instant the folds matched, there was a slight change in their pose; and one student followed the pieces with his finger, and murmured, that is one fourth, as though the comprehension was only to come when the idea became a reality instead of an image.

Group exploration was the next step which spiced up the classroom. The students with high ability capable of showing several strategies of partitioning and comparing their findings with ease, reflected that with the help of folding, they could easily notice the difference between one half and one fourth. Students with intermediate ability were active and their explanations were sometimes slower than the drawings made. Students with lower ability worked by the steps that were shown and each time they managed to get equal pieces they seemed to be less reluctant to take the effort of doing the next task on their own. These initial observations can be seen in the summary of observed indicators.

These initial differences in students' ways of explaining, representing, and applying fraction concepts were systematically observed across ability levels, as summarized in Table 1.

Table 1. Profile of Core Student Participants

Student Code	Ability Category	Initial Indicators Used for Classification
S1	High	Consistently explained fraction concepts verbally and symbolically; minimal teacher scaffolding
S2	High	Demonstrated accurate representations and cross-concept connections
S3	Medium	Understood concepts after visual or guided examples
S4	Medium	Required teacher prompts but showed gradual representational accuracy
S5	Low	Dependent on concrete manipulatives to recognize equal partitions

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S6	Low	Showed conceptual hesitation and required repeated physical modeling

The general profile of the six core student participants who participated in the in-depth qualitative analysis in the given research is summarized in Table 1. The participants were selected selectively to reflect different degrees of mathematical performance including high, medium, and low using preliminary classroom observations, teacher tests and their initial reaction to tasks involving fractions that took place prior to the introduction of the Realistic Mathematics Education (RME) approach. The classification was not meant to assign permanent labels to students, but rather it was aimed at capturing various learning paths within the same learning setting.

The high-ability category students showed an early conceptual understanding, such as an ability to explain concepts of fractions verbally, to use symbolic and visual representation correctly, and to relate ideas with little instructional support. Medium-ability students demonstrated half-baked knowledge, and often had to be shown pictures or illustrated examples or asked questions to elaborate their rationale. Contrastingly, students with low ability depended greatly on the concrete manipulatives and physical modeling to appreciate equal dividends and to build meaning meaning that they still based their knowledge on experience

These diversified profiles enabled the analysis to look at how students with varying backgrounds in terms of their understanding in the beginning interacted with the real world situations and how their mathematical knowledge developed during the process of learning through RME. The table also offers an analytical prism in which the later observation and behaviour development, student work, and the interview transcripts can be viewed more logically based on their foregone conclusions by foreshadowing these profiles in the beginning of the Results section. Such profiling thus makes the findings credible by clearly stating the foundation of the selection of the participants and through clarifying the interpretive framework used in analysing the learning process of the students.

Table 2. Understanding Indicators per Student Level

Indicator of Understanding	**S1 High**	**S2 High**	**S3 Medium**	**S4 Medium**	**S5 Low**	**S6 Low**
Concept explanation	very clear	clear	adequate	adequate	inaccurate	inaccurate
Identifying and classifying	accurate	accurate	good	fair	many errors	many errors
Representations used	varied	complete	adequate	adequate	minimal	minimal
Applying concepts	accurate	accurate	developing	developing	difficulty	difficulty
Connecting concepts	links decimals	mostly correct	partial	confused	unable	unable

Noticed differences within the cohorts define dissimilar starting epistemic positions. The high ability learners had a strong conceptual scaffold which allowed the smooth incorporation of linguistic, visual and symbolic representations. Nascent understanding was observed among medium ability participants but it was not stable. Students with low ability were still in the formative meaning construction and were mainly reliant on the manipulation of forms before abstract concepts could be internalized. A pre- post comparative analysis was done to explain how these individual differences were translated into the classroom level.

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Table 3. Pre–Post Tendencies

Indicator	Before RME (%)	After RME (%)	Description
Concept explanation	21	67	Students began using their own language
Identifying fractions	34	72	Stronger sense of equal partition
Representation	29	81	Increased confidence using diagrams and models
Application	18	63	Began applying ideas to real-life contexts
Connecting concepts	11	47	Initial ability to relate to decimals

The information in the table shows that the instructional interventions were not only content augmentation, but they changed the epistemological position of students on fractions. Many of the respondents who previously reread the definitions now tried to explain the concept in their words. The enhanced version of representational proficiency highlights the effectiveness of visual and tactile artefacts. In spite of the fact that tying fractions to their decimal counterparts remained the most challenging skill, the identified improvement is indicative of a new understanding of fractions as the elements of the more comprehensive numerical system. The behavioural patterns through the three meetings also added further explanatory properties.

Table 4. RME Classroom Activities and Student Behaviors Across Ability Groups During Each Instructional Meeting

Meeting	Main Activity	High Ability	Medium Ability	Low Ability
1	Understanding context	Explained independently	Understood after examples	Needed physical models
2	Representing fractions	Accurate folding and drawing	Needed repeated guidance	Relied on peers
3	Applying to new contexts	Applied across objects	Applied only to familiar ones	Struggled without boundaries

The development of the first to the last session proves that the students gradually got exposed to more abstract constructs. This transition seemed to be smooth to a group of participants, but to others it aroused hesitation particularly when faced with a scenario that required them to divide water without clear boundaries. A single pupil confessed, I do not know where the parts are, and the heavily dependent nature of the pupils was evident.

These incidences were repeated during the observation period. In one example, participant S3 put the paper in the wrong sections and the facilitator S4 intervened, instructing him in a methodical way towards the exact process. Similarly, when participant S6 showed frustration in the liquid partition activity, the instructor would assume the role of introducing a calibrated measure markers, which got him back on track. These small teaching interactions demonstrated that often learning occurs in small, subtle forms of changes and not in visible leaps.

There was a similar developmental path of written artifacts. Learners with high ability produced elaborate diagrams with explanatory text that was cogent. Medium-ability groups used illustrative sketches as the major components of anchoring their understanding. Students with low ability took some time before they could make equal partitions but later came up with the same when the instructor brought up folding and tracing techniques.

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Interviews supplemented the empirical results with the affective nuances. A high-order participant added that by slicing the cake that made the fraction real, thus depicting the abstraction to realism. One medium level participant observed, if I compete with the parts I can check them, which is the key to the significance of the visual cognition. One of the respondents with lower ability admitted, I realized afterwards, when I picked up the paper, the necessity of concrete engagement. There is also some increased confidence that some of the participants reported, which they had accredited to the pragmatic resonance of the activities with the everyday experiences, e.g., sharing food at home. These recurring patterns are summarized below.

Table 5. Emergent Learning Patterns Identified from Observations, Student Work, and Interviews

Pattern	Evidence	Interpretation
Need for concrete materials	Low-ability reliance on folding and cutting	Understanding formed through physical interaction
Importance of representation	Strong in high- and medium-ability work	Visual models helped stabilize ideas
Role of peer support	Students explained ideas to each other	Peer dialogue accelerated comprehension
Difficulty with abstract contexts	Water-division task challenges	Students needed transitional scaffolds
Increased motivation	Interview insights and active behavior	Contextual stories made mathematics relatable

The trends observed in the table provided below clarify how the students were able to make meaning in the learning process. There were members using haptic and kinetic, members using visual, and members using verbal means. Their understanding seemed to reach a higher stage when these modalities were merged. As the lessons continued, the learners moved beyond task performance and developed a sense of fractions as a phenomenon of meaning, which related to the idea of fairness and sharing and the mundane aspects of day-to-day existence. This learning experience was influenced not only by materials and situational context but also inter-student interactions, questions asked, surprises and moments of realization that occurred.

The current study also exposes a chain of learning processes that occur sequentially and are inseparably connected with the previous experiences that students are entering the classroom with. Apparently, mathematical meaning is easier to get when the concepts grow out of instances that are familiar to the everyday life of a student. This tendency is supported by recent scholarship. Muhadi, Wahyudin, and Arisetyawan (2025) argue that RME supports the process of progressive mathematization of conceptualizing intuition and experience to more formal conceptualizations by a natural process of progressive mathematicization of students. This suggestion is observed in our data, as the students with lower ability were dependent on tangible actions and tangible objects prior to defining the concept of equal parts.

The analysis of the visual representations used by students also adds to this story. The process of passive copying of diagrams to active use of the diagrams could be observed even in the ability levels. Ponte, Viseu, Neto, and Aires (2023) also report similar developments and found that manipulatives underlie early thinking in fractions by offering sensory points of reference that stabilize emerging concepts. Ahmad (2024) also introduces the idea that manipulatives provide a student with a chance to experiment and test their knowledge before working with abstract forms. This development process has been consistent with the findings of this research;

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the paper folding, other region shading and comparing the shapes were all activities that were used as cognitive milestones and the elaboration of conceptual clarity were facilitated.

The growing willingness of students to express mathematical concepts using their own linguistic registers provides additional information. When learners write some explanations in terms that make them feel connected to them, their explanations often reveal the level of their thinking. As Wilkie and colleagues (2023) point out, the representational environment created by the instructor has a highly influential impact on the cognitive and communicative processes of students with regards to mathematical concepts. This is what was observed in the current study where students continued to refer to the representations and models that were presented to them in the course of instruction to scaffold their verbal explanations.

Peer interaction was also a unique factor that influenced the development of understanding. The most vivid experiences of the learning process were the cases of the interaction between students when they used gestures, everyday life examples, and made free descriptions to understand the ideas. According to Gao, Evans, and Fergusson (2025), the explanations provided by students have cognitive worth since they reveal alternative lines of reasoning that are appealing to colleagues. The interactive discussion witnessed in this classroom shows how this interaction operated with the students tending to polish their thoughts to the interpretations given by their fellows.

The episodes where the students had a hard time, especially when dealing with contexts that are not delineated physically, provide an extra dimension. The task of partitioning water demonstrated the level of reliance of young learners on perceived objects in the interpretation of fractions. This is consistent with the results provided by Farra and other researchers in 2024 who also indicated that both concrete and digital manipulatives become ineffective in terms of tasks, in which students need to envision fractional divisions without perceptual structure. As soon as the introduction of measurement lines took place in this research, students gained confidence in their level of being able to reason about quantity. These instances present the necessity of transitional supports that enable the students to be taken by stages out of concrete reasoning into abstraction.

The emotional aspects of learning also came out strongly. Numerous learners showed a sense of increasing confidence and pleasure as the lessons proceeded. This tendency represents the implications of Umar and Zakaria (2023) who found that resource-based mathematical education with manipulatives can be used to enhance not only the performance on the problem-solving task but also motivation and persistence. The aforementioned findings also apply to studies by Suryani et al. in 2023 who argue that contextual tasks induce a sense of familiarity that enhances participation and diminishes fear. Emotions reactions recorded in this research are hence a part of the learning process and not an ancillary gain.

The recent research on resource-based mathematical education as a learning material gives an additive set of insights in which these findings can be interpreted. The study of Resti, Sulistiyo, and Haryanto (2025) shows that properly designed contextual tasks are more than simple and interesting situations. They direct students to the conceptual understanding by engaging students to interact with mathematical structures. The works of Sutarni (2024) and Lisnani and others (2023) can be seen as an extension of this observation, demonstrating that the reasoning pattern can be elicited with carefully constructed worksheets, which would otherwise be implicit. This principle is also reflected in the learning trajectory of the given study because

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the tasks were designed to assist the students in transitioning away to a more intuitive reasoning and towards a clearer conceptual knowledge.

The most recent studies on the efficacy of Representational-Mathematical Engagement (RME) such as those by Kurnaedi (2024) and Paradesa (2025) provide consistent evidence of the improvement of conceptual knowledge, representational fluency, and student engagement. However, these reviews also warn that symbolic generalisation requires further instructional assistance that is often needed. This strain is demonstrated by the difficulties the students face when trying to relate fractions to decimals. The literature highlights the fact that these kinds of relationship need instructional designs that make underlying structures visible to the learners, thus making them transfer knowledge. In turn, the results presented in this article can be added to the current academic debates on the significance of bridging activities that allow students to go beyond the contextual frame.

Despite the fact that these patterns are consistent with the larger trends in the study of RME, they also imply the possibilities of the further research. Some researchers have highlighted that longitudinal and mixed-method research is required to gain a better insight into the role of conceptual development at an early age in shaping later mathematical learning patterns. The observations made in the paper are detailed and offer a strong qualitative framework that future studies can use to analyze how the representational and contextual comprehension develops in the course of time.

The learning processes that were captured during the course of this study are illustrations of how mathematics can be approached in respect to experiences, interactions, and intellectual resources of children. This realization was not the result of the procedural teaching introduced, but a combination of a sympathetic mixture of behaviors, discussions, thoughts, and experiences. The classroom scenes found herein show that mathematical concepts are given a meaning when learners are motivated to explore, ask questions, compare and interpret in contexts that they can relate to their real life experiences. These overlapping reasoning and relating processes describe how conceptual knowledge is developed during human action, and not by the relaying of abstract rules.

Conclusion

According to the research findings and discussion, one can assert that the application of the Realistic Mathematics Education (RME) strategy through the use of real-life contexts has been proved to be effective in making the sixth-grade students of SDN Gunung Sekar Sampang gain a better understanding of mathematical problems.The RME based teaching model enables students to connect mathematical ideas with real life experiences thus making initially abstract ideas more comprehensible and meaningful.Learners demonstrate enhanced abilities to express ideas, use varied representations, and apply the knowledge to new situations through the activity focused on exploration, discussion, and reflection.The process of learning does not simply focus on the achievement of the final results but also on the independent formulation of the conceptual meaning by students in the real-life context.

Besides, the implementation of the RME strategy develops student activity, self-confidence, and critical thinking skills in solving mathematical tasks. Students are more open in terms of interaction, arguing, and collaborating with peers.This role of the teacher therefore becomes an active facilitator rather than a passive source of information thus creating a more interactive and interesting environment of learning.Thus, one can assume that the mathematical learning experience of the RME approach does not only enhance conceptual knowledge, but also

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fosters the positive attitude towards mathematics as the inseparable part of the real life that is consistent with the lived experiences of the students.

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