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Analysis of implementing Realistic Mathematics Education principles to enhance mathematics competence of slow learner students

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Abstract

One of the Education for Sustainable Development Goals is to provide equitable and inclusive access to quality education for all. However, some children with special needs, particularly slow learners, have yet to be able to enjoy inclusive and high-quality learning services. This research aims to enhance slow learners' competence by implementing the Realistic Mathematics Education Approach. It is descriptive qualitative research, with data collection techniques including focus group discussion, interview, and learning observation. The analysis involved comparing the principles of Realistic Mathematics Education in theory with those applied by teachers, as well as the learning approach used by teachers with those required by slow learners. The findings indicate that while some teachers have implemented learning based on the principles of Realistic Mathematics Education for all students, there needs to be more focus on interventions specifically tailored to the needs of slow learners. Furthermore, teachers still need to fully understand the services required by slow learners based on their unique characteristics. The implementation of Realistic Mathematics Education to meet the learning needs of slow learners in mathematics has primarily focused on activity and interactivity principles without emphasis on the understanding of concepts to enhance their competence.

Keywords: Junior High School, Mathematics, Realistic Mathematics Education, RME Principles, Slow Learners

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Inclusive education is crucial for ensuring that every citizen has access to quality education (Ministry of National Education, 2009; García & Toledo, 2020), and focuses on accommodating diverse learning styles and needs to enable each student to achieve their maximum potential and contribute to a fairer and more equitable society (Windsor et al., 2022). However, quality inclusive learning services have not been available to slow learners on the borderline (with an IQ of 70-85 points). Slow learners cannot receive special education, although their competencies are below the average of their peers as they have heterogeneous cognitive difficulties (Kaznowski, 2004; Baglio et al., 2016). They need more time to learn and understand materials related to symbols, abstraction, and concepts (Sintawati et al., 2022; Khaira & Herman, 2020; Sovia & Herman, 2020); they may find difficulty concentrating, possess a shorter attention span than their peers, struggle to understand instructions with multiple steps, have difficulty generalizing

information (Setyawan et al., 2021), and need additional practice and a longer duration to acquire academic skills comparable to their peers (Murdiyanto et al., 2023). Regarding their limitation, mathematics is often cited as the subject in which slow learners face the most difficulties (Fritz et al., 2019). In contrast, mathematics is an essential and compulsory subject taught throughout all levels of education, from primary school to tertiary institutions. In addition to being essential for academic achievement, mathematics is also critical for children's future success (Aunio et al., 2021).

Slow learners need a particular approach to understand materials related to symbols, abstraction, and concepts. Mathematics learning should occur in a context that is not detached or abstract but instead incorporates children's real-life experiences. When children can relate their mathematical understanding to practical situations, they become more engaged and understand why and how specific calculations are used to solve problems (Papadakis et al., 2017). Realistic Mathematics Education (RME) is considered an appropriate learning approach for slow learners with their characteristics (Murdiyanto et al., 2023; Papadakis et al., 2017).

Providing quality education for children with special needs requires adjustments to the content, teaching methods, and overall education structure to meet their individual needs (Office of the High Commissioner for Human Rights (OHCHR), 2020). The constructivist learning approach, which includes RME, is more effective than conventional approaches because it can improve students' reasoning skills. The higher the students' reasoning skills, the higher their academic achievement will be across all levels of reasoning ability (Riyanto & Siroj, 2011). Empirical pieces of evidence have demonstrated the effectiveness of the RME approach in facilitating mathematics learning (Domínguez-González & Delgado-Martín, 2022; Reinke & Casto, 2022; Ariyanti, 2016). Domínguez-González and Delgado-Martín (2022) analyze how students are exposed to real-life problems related to sustainable development or other subjects and can solve them through realistic mathematics. Reinke and Casto (2022) show the correlation between using curricula that intentionally incorporate contexts as conceptual supports and developing more nuanced understandings of how contexts can foster deep mathematical understanding in students. Aryanti (2016) concluded that realistic mathematics learning impacts students' skills in representing and communicating mathematical concepts. Students who engage in realistic mathematics learning demonstrate higher mathematical representation and communication abilities than those who follow traditional instructional methods. The empirical evidence on the RME shows the effectiveness of RME implementation in increasing students' understanding of mathematics but has not been widely applied, especially for slow learners.

The research aimed to identify effective strategies for enhancing mathematics competency, especially for slow learners, by utilizing the RME principles that align with their unique characteristics and requirements, as supported by the findings. This is very crucial as mathematics plays an essential role in children's cognitive development, problem-solving abilities, numeracy skills, and ability to make sense of the world around them. RME and its principles of reality, activity, levels, intertwinement, interactivity, and guidance are considered a practical approach to meet slow learners' need to understand symbols, abstraction, and concepts, concentrate, memorize, understand learning stages, and adapt new information to information they already know, and generalize it.

METHODS

This study is categorized as qualitative research, indicated by the following five characteristics: (i) Exploring the significance of individuals' lives within their actual societal roles; (ii) expressing the opinions

and perspectives of individuals involved in the study; (iii) directly considering and integrating real-world conditions and circumstances; (iv) providing insights from established or novel concepts to enhance understanding of social behaviour and cognition; and (v) acknowledging the potential importance of various forms of evidence, rather than relying solely on a single source (Yin, 2016). The implementation of these five characteristics in this study includes the following: (i) Investigating the role of mathematics teachers in addressing the needs of students with slow learning abilities, (ii) capturing the viewpoints and opinions of experts in RME, experts and practitioners in special needs education, education policymakers at city/district, school principals, mathematics teachers, and slow-learning students; (iii) describing the actual learning conditions in mathematics classrooms where slow-learning students are present; (iv) providing insights from RME concepts to enhance understanding of slow learners' social behaviour and cognition; and (v) employing various methods to gather evidence, including Focus Group Discussion (FGD), interview, and observation.

Driven by a desire to improve Indonesian children's mathematics achievement at the global level. Indonesia has participated in PISA since 2001, and from then until 2018, the mathematics achievement of Indonesian children has consistently been below the average of participating countries (Avvisati et al., 2019; Mitari & Zulkardi, 2019). Since Programme for International Student Assessment (PISA) participants are selected randomly, slow learners may be among them. The PISA 2022 framework emphasizes reasoning, and this skill can be developed through RME (Zulkardi, 2022). Using RME, students in Indonesia can potentially improve their mathematics achievement in PISA.

The attractiveness of qualitative research lies in the opportunity to obtain in-depth information by sampling a small number of participants (Cohen et al., 2007; Yin, 2016), which is particularly suitable for schools implementing RME with limited numbers. Considering this factor, as well as resource constraints, the study designed data collection in only three locations where schools implementing RME are located. These three locations are Palembang City (South Sumatra), West Bandung Regency (West Java), and Trenggalek Regency (East Java). The number of target schools in each location is three schools, consisting of RME and inclusive schools. The selection of inclusive schools as samples is based on the consideration that the concepts teachers use with special education students can be beneficial for assisting slow learners once their weaknesses have been diagnosed (Borah, 2013).

The data for this study was gathered using a combination of methods, including FGD, classroom observation, and interview, with each method following specific guidelines. The FGD involved experts in RME, experts and practitioners in special education, education policymakers at the district/city, school principals, and mathematics teachers. The observations were carried out after FGDs. Interviews were conducted with mathematics teachers, school principals, and three slow-learning students in each school. Teachers were interviewed after classroom observations to clarify their teaching practices, such as creating enjoyable learning experiences and addressing challenges related to slow-learning students. School principals were also interviewed to explore how they identify slow-learning students and the factors affecting implementing mathematics learning with the RME approach. Interviews with slow-learning students focused on their perspectives after participating in mathematics classes, assessing their enjoyment and understanding of the taught material. The teachers identified Slow-learning students as respondents based on their criteria, including consistently slower completion of school tasks compared to peers and below-average academic performance (Borah, 2013). The Social Humanities Ethics Commission of the National Research and Innovation Agency of the Republic of Indonesia met the ethical clearance requirements.

The collected data were processed using inductive reasoning to identify patterns and insights, in

line with the view that in qualitative research, data processing is done by grouping data into a specific criterion to conclude. Although the theoretical domains provided a strong foundation for our analysis, the inductive categories proved to be more effective in organizing the review data and revealing new insights (Bonner et al., 2021; Van Vo & Csapó, 2022). Data were analyzed by comparing the RME principles with the design and implementation of the learning process. Considering that RME is an approach for mathematics learning in general, not only for slow learners, its implementation strategies through RME principles need to be elaborated and adapted to the characteristics and needs of slow learners.

RESULTS AND DISCUSSION

This research was analysed based on the principles of RME. A research using RME principles was carried out by Fauziah et al. (2020). The principles include reality, activity, level, intertwinement, interactivity, and guidance (Heuvel-Panhuizen & Drijvers, 2020). These principles were analyzed concerning the design and implementation of mathematics learning. The main emphasis was on adapting and refining the implementation of the principles to meet the requirements and traits of individuals who have difficulty learning at a normal pace. RME represents an encompassing pedagogical approach that fosters mathematical learning for individuals across a broad spectrum of abilities, emphasizing its relevance for all rather than solely providing to those considered as slow learners.

The Principle of Reality

Realistic situations are a prominent characteristic of RME. These situations serve as a source for developing mathematical concepts, tools, and procedures in learning, which students can then apply to the real world (Heuvel-Panhuizen & Drijvers, 2020). Students need a teaching method that allows them to connect mathematical concepts with practical applications so that problem-solving becomes meaningful (Palinussa et al., 2021; Putri et al., 2022). Similarly, slow learners will face greater learning difficulties when it is not done contextually (Manikmaya & Prahmana, 2021; Wanabuliandari et al., 2021). Therefore, mathematics learning for them should be linked to the realities of their lives. The Mathematics Curriculum in elementary education in Indonesia already contains the principle of reality, where every material in all chapters of the student book begins with a context taken from real life. This finding is in line with the opinions of Fauzana et al. (2020), Barnes (2005), and Ashari and Salwah (2021). The application of the reality principle is expected to bridge the knowledge of slow learners about daily life to their understanding of abstract mathematical concepts.

The lesson plans prepared by observed teachers already contain the principle of reality, but they still need to be more general and include intervention plans for slow learners. The principle of reality is not only needed by learners in general but also a learning need by slow learners (Barnes, 2005), which focuses on understanding, involving learners using meaningful contexts, and emphasizing problem-solving. Understanding mathematical symbols will be easier to remember if they are linked to the real world through pictures or stories, real objects, or other media (Aprinastuti et al., 2020; Palinussa et al., 2021). The reality principle, which refers to events or experiences, helps slow learners understand knowledge and build concepts to solve problems because slow learners struggle to think abstractly. In addition, learning for slow learners must be focused and carried out gradually by paying attention to their difficulties in following long stages, focusing attention and concentration because they are slow in receiving and understanding a lesson (Setyawan et al., 2021) so repetition is needed to improve their memory (Munje et al., 2021).

The principle of reality is already included in the basic competencies of the curriculum. The observed teachers have implemented it in the learning process according to the learning design. However, some information from FGD concluded that teachers need help linking certain learning materials with students' experiences, daily lives, or activities they can imagine. To discover mathematics learning materials that are both realistic and contextual, one approach is to conduct a systematic literature review study on ethnomathematics for a specific region, such as West Java or Papua. Ethnomathematics refers to the study of how mathematics is understood and applied within a particular cultural context (Gerdes, 1996) In this case, the teacher needs to investigate how local culture can be linked to mathematical concepts, how these cultural elements can help in developing mathematical understanding. This demands not only teacher creativity but also profound analytical abilities.

The observed teachers have applied the principle of reality through learning about speed, distance, and time by measuring the speed of a car; transformations with the context of reflection, slope/gradients with the context of determining the slope of a road that can be passed by a vehicle, determining the amount of aid for disaster victims based on the number of family members; and equations and inequalities with the context of determining weight using a scale. Through problem-solving efforts, students build mathematical concepts from situations presented in learning. However, applying the reality principle has not been differentiated because slow learners are still given the same material as other children. Attention and guidance for slow learners have not yet been provided. The interview results validate the existing finding that the teacher lacks an understanding of effective strategies for addressing the needs of slow learners. This conclusion is supported by a teacher's awareness of the presence of slow-learning children in the classroom, which is based on a parent's report on the child's condition. Furthermore, the parents have made attempts to provide therapy for the child, reinforcing the notion that the teacher's understanding remains insufficient in this regard. Hence, teachers should enhance their comprehension of recognizing and addressing children with slow learning abilities. This can be achieved through training sessions, peer discussion, or individual study. The FGD reveals that both parents and teachers play crucial roles in offering support and reinforcement to children, enabling them to engage in activities that lead to successful experiences. This positive reinforcement helps cultivate a sense of confidence and optimism regarding their abilities. Additionally, it is emphasized that providing children with realistic expectations, which are attainable, further contributes to their growth and development.

With their characteristics, slow learners need real (contextual) learning material to be easily understood. Direct involvement of slow learners in learning will greatly help them understand what is being taught, for example, through simulations where slow learners become actors in them. Thus, slow learners directly experience events built according to their daily life experiences. The support of using familiar media for them, such as pictures, videos, teaching aids, and games, is needed to help slow learners understand simple mathematical concepts so that they can solve mathematical problems.

The Principle of Activity

The principle of activity in RME emphasizes the idea that mathematics should be viewed as a human activity, which means that students are treated as active participants in the learning process. This principle is achieved by involving students directly in solving mathematical problems (Heuvel-Panhuizen & Drijvers, 2020). The involvement not just inspiring students through everyday life situations, but also seeking out contexts that experientially real for them, serving as foundations for the gradual application of mathematical concepts (Bonotto, 2007).

All schools have included the principle of activity in their lesson planning, both in the introduction and the core activities. Teachers stimulate student activity by asking informal questions about the daily lives and activities of students as well as about the material being learned and by providing opportunities for students to ask questions, respond to their classmates' work, and engage in discussions. During the learning process, teachers have tried to stimulate slow learners by questioning the material taught, asking them to present their work in front of the class, and asking other students to help if they need assistance. In addition, stimulation is also carried out through activities such as selecting media to be used, observing, reasoning, and associating, then becoming an actor or model in practice related to the learning material, and working in group completing their tasks.

The observation results show that most students are active in learning except for slow learners who possibly do not understand what the teacher is conveying. The slow learners reported facing comprehension difficulties and expressed that they did not fully grasp the concepts they were taught when interviewed about their understanding. A statement from a special needs children expert in FGD mentioned that slow learners often delay completing assignments and have low academic achievements. One of the reasons is also due to short-term memory and often forgetting newly learned materials. The inactivity of the slow learners leads to their reluctance to ask questions due to communication difficulties (Borah, 2013). That is in line with the characteristics of slow learners who are slow in catching the lesson and slow in completing school tasks (Borah, 2013; Khaira & Herman, 2020).

The RME can effectively improve communication ability (Harahap & Sari, 2022; Palinussa et al., 2021; Trisnawati et al., 2018). But most teachers are reluctant to apply this approach in their learning regarding the difficulties in finding enough realistic and contextual learning material for the grades they teach, difficulties in obtaining learning support facilities, and do not understand RME comprehensively, and being more comfortable teaching with conventional approaches. From the observation, we can conclude that teachers have stimulate student activity by asking informal questions about the daily lives and activities of students as well as about the material being learned and by providing opportunities for students to ask questions, respond to their classmates' work, and engage in discussions. During the learning process, teachers have tried to stimulate slow learners by questioning the material taught, and asking them to present their work in front of the class. Based on the characteristics of slow learners, the learning strategies that need to be implemented by the teacher include (i) engaging them in interactive Question & Answer sessions to stimulate their interest; (ii) encouraging their active participation in group discussions; (iii) allowing them to take the lead in problem-solving activities; (iv) using relatable "real-life" examples to teach mathematics and facilitate their learning; (v) incorporating mathematics-related games like sudoku, puzzles, and board games; (vi) recognizing and praising their efforts when they complete given tasks; (vii) fostering collaboration between schools and parents to encourage the participation of slow learners in various activities at home; and (vii) developing Individual Education Plan/IEP (Borah, 2013; Heuvel-Panhuizen & Drijvers, 2020; Offenholley, 2012; Palinussa et al., 2021; Putri et al., 2022).

The Principle of Levels

The principle of levels in mathematics learning emphasizes the progression of student's understanding through various levels: from solutions related to informal contexts, then creating various shortcuts and schemes (called semi-formal), until obtaining insights about the connection between concepts and strategies (formal). Models are essential to bridge the gap between informal mathematics related to contexts and more formal mathematics (Heuvel-Panhuizen & Drijvers, 2020; Fauzana et al., 2020; Gravemeijer, 1994). Modeling in mathematics education encourages students to enjoy the subject and

be motivated to create models uniquely, so modeling learning should be implemented from elementary school to university (Riyanto et al., 2019).

Some of the observed teachers have already incorporated the principle of levels into their lesson plans by including problem-solving from the contextual/realistic level to the semi-formal level and then to the formal level. For example, in determining the gradient of a movement, students are asked to observe a picture of a winding road in a coal mining area. Then, the teacher asks if it is possible for a car at the bottom to climb up to the surface with a straight vertical path (informal level) shown in Figures 1 and 2.

Figure 1. Roads condition in mining (Source: antamindo.com)

The example given to determine the gradient of a movement involves asking the students to observe a picture of a circular road in a coal mining area, and then the teacher asks if it is possible for a car at the bottom to go up to the surface by driving straight up (informal level). The students answer this by practising with a toy truck that is tied to one end of a string and placed at the end of the road, while the other end of the string is attached to a weight that is a basket containing marbles. The students determine the slope of the road using a ruler. The slope is determined based on the weight that the truck can pull (semi-formal level). Then, the students get the answer to the factors that affect the car's ability to go up easily, which is by adjusting the height (vertical component) and width (horizontal component) to determine the slope of the road. At the formal level, the formula for the gradient is obtained, which is the quotient of the vertical component with the horizontal component: $m = \Delta y/\Delta x = (y2-y1)/(x2-x1)$.

Another example is applied to the "changing reflection in the form of point mapping with one line to show the position of the image" theme. It is done through simulation with a mirror (informal level) to point mapping with one line as semi-formal. Next, the formula for reflection against the x-axis, y-axis, the center point (0,0), and the line y=x is obtained (formal level). The other example is changing the problem into a one-variable linear equation or inequality. It means changing from reality and contextual to semi-formal in the form of arithmetic.

Based on observations, the implementation of the level principle for slow learners has not been applied in mathematics learning at school. If applied, it would be difficult for slow learners to achieve a formal level of mathematical understanding due to their characteristics, including difficulties in understanding concepts, principles, algorithms, calculations, and generalizing information. Thus, the achievement of the level principle can be reduced to a semi-formal level, or the material can be simplified

in the sense of having a lower level of difficulty (different from the material given to other children) so that slow learners can reach a formal level. This is reinforced by the FGD result that an education expert specializing in children with special needs highlighted the necessity of creating an environment that facilitates the overcoming of learning barriers for slow learners. Building upon the OHCHR's previous statement, these experts emphasized that accommodating the learning needs of slow learners requires not only adaptations or adjustments to the environment but also to the content and teaching methods employed. That teachers should have the ability to adapt and adjust the content and teaching material including simplify the learning material.

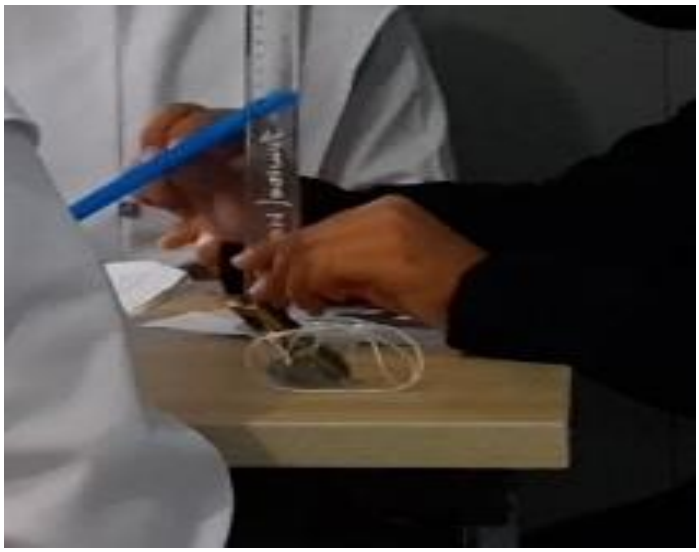

Figure 2. Students are calculating the gradient

The Principle of Intertwinement

The principle of intertwinement is present in the domain of learning material, meaning there is a connection between mathematical elements, including numbers, algebra, measurement, geometry, data analysis, and probability (Arnellis et al., 2020). In addition, the observed learning also shows the connection between mathematics and reality or context beyond mathematics. The principle of intertwinement dominates the design of the learning process (Arnellis et al., 2020). Therefore, it should be explicitly explained in the lesson plan and implemented in its execution. The principle of connection enhances students' understanding by mastering the initial competencies of the subject matter to be learned. For teachers, the principle of connection is beneficial in improving their understanding of students' initial competencies in certain learning materials so that they can strive to improve students' understanding of the next competencies.

Although implicitly, the principle of intertwinement is already included in the current curriculum. In this case, the learning material is organized systematically according to the goals and objectives of the curriculum, from simple to complex, from low to higher levels, both for cognitive, affective, and psychomotor. The statement from simple to complex indicates that the curriculum has considered the prerequisites for providing a subject matter so that the prerequisite material is included in the principle of intertwinement.

Among other RME principles, most teachers have not explicitly written the principle of intertwinement in the lesson plan. Regarding prerequisite material, only a small number of teachers

observed explicitly wrote it. The statement of the prerequisite material is expressed as follows. One of the teachers, in the lesson plan, states the activities carried out during apperception, namely: i) linking the learning material/theme/activity to be carried out with the learners' experiences and/or previous material/theme/activity; ii) reminding learners of prerequisite material by asking questions, and iii) asking questions related to the material to be taught. Other teachers write about initial competencies or prerequisite material in the form of algebraic elements and algebraic arithmetic operations.

The principle of intertwinement is very important for slow learners, so teachers are expected to link previous mathematical concepts with the ones to be taught. This intertwinement will help slow learners increase their confidence in learning mathematics and prepare them for new knowledge/skills. All observed teachers mentioned the difficulty of slow learners in understanding concepts. This aligns with the opinion that slow learners also experience failure in understanding basic academic subjects, such as reading, writing, and arithmetic (Erickson, 1982). According to Zental and Ferkis (1993), poor and inaccurate computational skills contribute significantly to a significant impediment to problem-solving. Therefore, the principle of intertwinement for slow learners needs to be emphasized more than for other children. Because slow learners need help understanding mathematical concepts, building this concept is necessary (Rajkumar & Hema, 2017).

A solid grasp of the learning material is crucial in improving memory capacity. Due to their lower levels of comprehension, individuals classified as slow learners also experience a corresponding decrease in their memory capacity. The characteristics of slow learners with a low memory capacity (Erickson, 1982) require repetition/remediation to understand the material that had been taught (Borah, 2013; Shah et al., 2020). One strategy teachers must apply is to repeat previous material that is a prerequisite for competency in the material to be taught, for example, during the apperception. One way to do this is by the teacher asking questions or vice versa. In addition to helping slow learners remember prerequisite competencies, answering or asking questions is an effort to train communication skills, considering that slow learners have difficulty conveying information, expressing themselves, understanding the meaning of words or language rules, and are not accurate and fluent in communication (Rajkumar & Hema, 2017).

Another strategy is for teachers to collaborate with the parents of students. In line with their professional development, teachers who teach in inclusive classrooms require skills, knowledge, and strategies to collaborate with parents of children with special needs (Ng & Kwan, 2020). FGD concluded that linking parental collaboration with teacher professional development shows that collaboration between parents and teachers plays an essential role in learning success. This collaboration includes parents accompanying their children in preparing for the next day's learning and guiding them to recall previously learned materials. In line with that, teachers need to convey the upcoming learning materials to parents of slow learners. Communication can be done through a communication book, a parent WhatsApp group, sending emails, or incidental or periodic face-to-face meetings, to discuss the child's development. The bottom line is that good collaboration between parents and teachers is needed to solve the child's problems.

The Principle of Interactivity

The principle of interactivity occurs when there is an interaction between students or between students and teachers. Through this principle in the learning process, students are expected to actively participate in discussions, express ideas, and engage in both classroom and group activities (Arnellis et al., 2020). With the principle of interactivity, teachers must provide opportunities for students to communicate their

ideas through interactive learning, such as group discussions, group work, or class discussions. The research findings of Cibulskaitė and Jurkėnaitė (2014) support the importance of interaction in learning as it significantly affects mathematics learning outcomes.

The classroom observation results show that all teachers have implemented the principle of interactivity for slow learners. At the beginning of the lesson, the teacher greets slow learners by calling out their names. Some are also asked to take the learning materials prepared for the day. Slow learners typically have difficulty concentrating during learning, which was evident during the observation. While the teacher directed the students, slow learners often daydreamed, looking out the window or at the ceiling. This is consistent with the findings of Hasibuan et al. (2022) that slow learners quickly lose concentration. Interview results with slow learners showed that they disliked mathematics lessons. This causes slow learners to be less motivated to learn (Rajkumar & Hema, 2017) and results in lower mathematics grades than their peers, as seen in student grade data.

Similarly, the findings of Zentall and Ferkis (1993) and Deeksha and Kaur (2016) show the same thing. Therefore, the learning concentration of slow learners must be maintained during the lesson. One strategy to maintain the concentration of slow learners is to create a learning environment that is interesting and enjoyable, for example, by giving appreciation in the form of praise, giving easy tasks, communicating not only related to lessons but also asking about family, hobbies, or activities of slow learners outside of school. These simple things can boost the learning spirit of slow learners. The interviews uncovered that slow learners find enjoyment in learning through this approach and have a fondness for mathematics. Another strategy implemented by the observed teacher is to maintain the learning concentration of slow learners by creating a learning atmosphere that encourages interaction, namely by dividing students into several groups to complete tasks. The teacher has designed the group learning activity in the lesson plan. In an interview, the teacher stated that group learning is very effective because less able learners can learn from their more capable peers. This opinion is in line with the findings of Putranto and Marsigit (2018) that peer tutoring methods with the RME approach are very effective in improving the abilities of slow learners.

One area of concern for teachers in forming study groups is that they often overlook the needs of slow learners. For example, forming three study groups based on the previous test results - those who got good, moderate, and poor grades - may result in slow learners being left out of a group, as was the case with only one slow learner in the class. Another finding was that most students only wanted to work in a group with certain friends and were left unattended by the teacher during the classroom observation. This condition has the potential to make it difficult for slow learners to find a group to work with. Grouping students this way should be avoided, as it can make slow learners feel isolated and further undermine their self-confidence. As a result, slow learners may become increasingly more active, withdraw from social interactions, and find it increasingly more challenging to express themselves (Rajkumar & Hema, 2017). An expert of RME in FGD stated not to use incorporated learning that isolated students, He proposed grouping students with tutors, learning according to students' interests, and assigning responsibilities. Therefore, it is necessary to use grouping strategies that have the potential to increase the self-confidence of slow learners, such as combining them with more academically advanced students in one group. This is supported by several research syntheses and meta-analyses, which have reported favorable outcomes regarding the influence of peer feedback on student learning and academic achievement (Vattøy & Gamlem, 2023).

The Principle of Guidance

The principle of guidance is a form of guidance that requires students to experience learning mathematics as a process like discovering mathematics formulas (Gravemeijer, 1994). In the learning process, teachers are expected to actively guide students to progress through the stages of mathematical understanding from informal to formal (Arnellis et al., 2020). In line with this principle, slow learners learn from the contextual concept provided by everyday life activities. They learn from the more accessible stage to the difficult one, like Borah's statement (2013).

Based on observation, the guiding principle has been implemented by the teacher. In the guidance process, the teacher is seen actively approaching each group to ensure that they are working on exercises and providing guidance to groups experiencing difficulties. The teacher can be seen guiding one of the groups by sitting down with them to be on the same level as the students so that they feel comfortable and happy working on the problems (see Figure 3). It aligns with the research that stated RME can build students' happiness because RME motivates students to be active, creative, and encourage them to work together and communicate (Lesnussa, 2019).

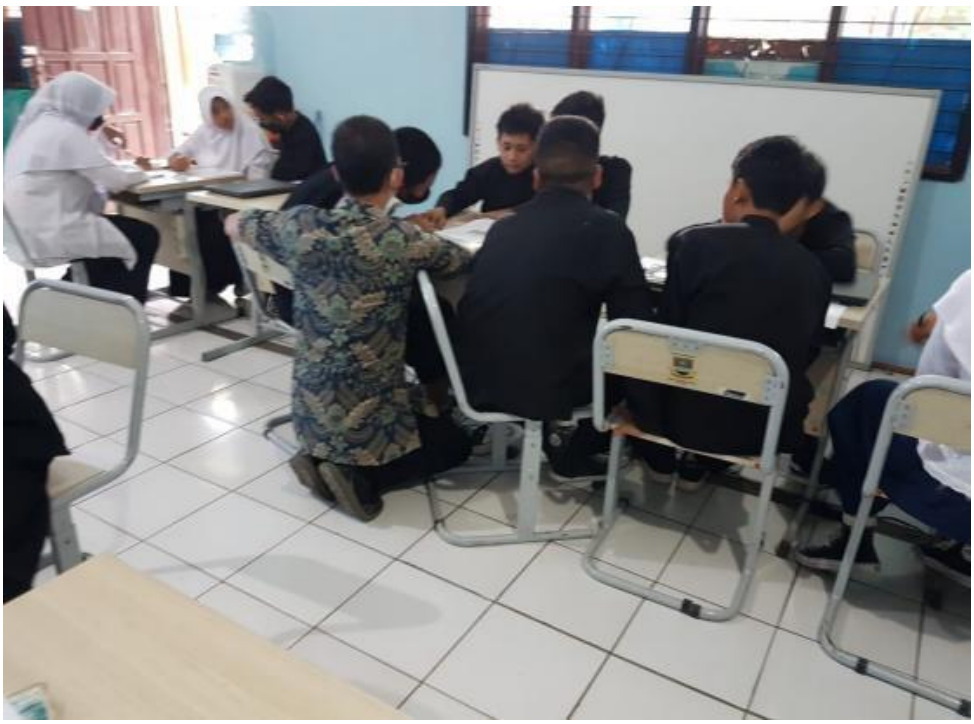

Figure 3. The teacher is providing guidance.

In another school, the activities involved in implementing this principle include the teacher providing explanations and periodically asking students various questions. Students collaborate in answering these questions, and then they collectively draw conclusions from data analysis, utilizing their own strategies. They express their group's conceptualization orally, and finally, both students and the teacher jointly summarize the reflection concept.

The teacher has not yet provided specific guidance to slow learners in some schools because the teacher has just identified the slow learners and does not know how to handle them properly. In other schools, the teacher tries to guide by asking about the difficulties faced by slow learners in the group,

and one inclusive school has a classroom specifically for special needs children, including slow learners, to provide repetition/remedial at certain times.

Guidance for slow learners in mathematics can be done using various strategies, including (i) building a good relationship with the child by listening to and respecting their opinions so that they feel comfortable and trust their teacher, (ii) applying various learning methods that suit the characteristics and needs of slow learners using audio-visual media, games, or group discussions to facilitate children's understanding of mathematical concepts, and (iii) providing exercises that are adjusted to the child's abilities, and ensuring that the child truly understands the concept before moving on to the next concept. Similarly, materials for slow learners should be simple solutions, not complex ones, but still within or slightly above their range of ability or zone of proximal development (Kruiper et al., 2022). With Vygotsky's scaffolding theory, slow learners are helped to understand the basics of mathematics in solving problems and understanding advanced materials.

The application of the scaffolding theory in supporting learning for slow learners can be made through different means, according to the availability and level of understanding of slow learners, which is adapted from (Kruiper et al., 2022). It can include modeling (showing how to do something, for example, through simulation), instruction (step-by-step guidance on what to do), providing directions and explanations (how to do a task in more detail), giving feedback (suggesting improvements to slow learners' work), verification (clarifying or confirming slow learners' understanding), and verbal participation (encouraging slow learners to ask questions and participate in discussions actively). From the result of observation, FGD, and interviews, it can be concluded that slow-learning students need to be guided to improve their knowledge and ability to understand concepts in mathematics and use them in their everyday lives. Teachers should improve their use of various media to guide slow learners to master the concepts and practice using them in solving everyday problems. Kumari and Kataria (2022) said that students with slower learning abilities typically gain advantages from guided instruction, personalized instruction, peer tutoring, and a well-structured curriculum enhanced by audio-visual learning resources offered in remedial classes.

CONCLUSION

The six principles of RME have been written in the planning and applied in the implementation of learning. However, these principles have not been specifically intended to address slow learners according to their characteristics and needs, except for the principles of activity and interactivity. Meanwhile, the other four principles emphasize the understanding of mathematical concepts. To apply these principles to slow learners, modifications are needed in the content, methods, and learning strategies. Such changes can be made through the strategies proposed in each principle of RME.

The research is expected to contribute to supporting the development of mathematical competence for slow learners, enhancing the quality and learning outcomes of slow learners' mathematics to contribute to the realization of sustainable development goals (SDGs), enhancing the performance of junior high school mathematics teachers, improving the school principal's performance in enhancing school quality, and as a basic of developing RME learning model for slow learners. Due to the limited availability of data of junior high schools that implement the RME approach, it becomes challenging for the researchers to determine a suitable research location. Additionally, even if such schools are found, they are not guaranteed to have slow learners. Other challenges are a lack of complete documentation of individual progress reports of slow learners and teachers not possessing IEPs for slow-learning

students. Further research and development regarding services for slow learners in mathematics learning through RME and the reluctance of teachers to implement RME are needed to determine the effectiveness of these strategies.

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Declarations

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