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Implementation of Realistic Mathematics Learning in School (Phenomenological Study at State Junior High School 1 Manokwari)

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Abstract

This research method is a phenomenological study to describe the implementation of realistic mathematics learning in State Junior High School 1 Manokwari and to test the construction of mathematics teachers' perceptions of the meaning of realistic mathematics learning. This study uses observation, interview, and recording techniques to explore perceptions and implementations of realistic mathematics learning. The results showed that mathematics teachers at State Junior High School 1 Manokwari carried out realistic mathematics learning in a different way of perception. There is a tendency to apply the principles of realistic mathematics learning, using contextual questions that students can see, experience, or imagine to implement realistic mathematics learning in the classroom. In addition, another tendency is that teachers do not understand the concept of realistic mathematics learning, as evidenced by the lack of use of demonstration methods as motivational triggers in realizing students' mathematical ideas and concepts. Mathematics teachers need to be aware of themselves as facilitators of student learning because they build formal knowledge in a holistic and sustainable manner. This research shows that perception has a strong influence on certain decisions or actions.

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INTRODUCTION

The implementation of curriculum 2013 is Indonesian government's response to the learning challenges of the 21st century. This curriculum is a reference for the Indonesian government to improve higher order thinking skills (HOTS) (Subkhan, 2020, p. 60) while at the same time responding to the assessment needs of international students in terms of reading, mathematics, and science. Based on the results of the Program for International Student Assessment (PISA) in 2018, the average math score of Indonesian students reached 379 with an average score of 487 by the Organization for Economic Co-operation and Development (OECD) (Kemendikbud, 2019). These results are taken into consideration by the government to determine the direction of education and learning policies (OECD, 2018, p. 1).

The purpose of learning is a change in perception and behavior, including behavior improvement (Iskandar, Bayu; Haryono; Utanto, 2019, p. 80). This behavior change occurs as a result of conscious, continuous, functional learning, is positive, active, and covers all aspects of behavior (Hanafy, 2014, p. 68). As one of the compulsory subjects in junior high schools, mathematics as an abstract science must be designed in such a way that teachers do not teach in a monotonous and boring method to students (Agustrianita et al., 2019, p. 18). In this abstraction, students' critical and creative thinking skills must be maximized by the teacher (Isdiarti & Man, 2018, p. 50) by designing meaningful mathematics learning (Astuti et al., 2022, p. 29). In 21st century learning, teachers are required to be more professional and qualified (Gunadi et al., 2022, p. 11).

Teachers are also required to be able to encourage students to develop themselves and their abilities (Haryono et al., 2019, p. 231). Furthermore, Sachdeva (2021, p. 2) states that learning mathematics must lead students to think critically through active and meaningful learning. One of the learning models that can maximize students' skills in reasoning using patterns, traits, compiling facts and evidence, and even generalizing mathematical ideas and concepts in their lives is realistic mathematics learning (Purwitaningrum & Prahmana, 2021, p. 13). Realistic mathematics learning emphasizes process skills (doing of mathematics), discussing, collaborating, and arguing with fellow learners so that students can find out for themselves (student inventing) a formal mathematical concept (Rahmawati et al., 2018, p. 219).

Freudenthal's statement "mathematics is a human activity" underlies the concept of realistic mathematics. Realistic mathematics learning is an approach to mathematics learning in the Netherlands, but has been developed in Indonesia since 2001 (Fauziah et al., 2018, p. 1). Teachers often misinterpret the word "realistic" as the real world, even though the word "realistic" is taken from the Dutch "zich realiseren" which means "to imagine" (Van den Heuvel-Panhuizen, 1996, p. 10). Van den Heuvel-Panhuizen explained that the word "realistic" does not just show the relationship of mathematics to the real world but rather refers to the focus of realistic mathematics learning in placing emphasis on the use of certain imaginable situations by students. Ainurrachmani (2022, p. 68) also argues that realistic meaning is something that exists in students' lives, which is real or affordable by students' imaginations.

A study by Mariana (2021, p. 6) states that even though teachers have attended a series of workshops on realistic mathematics learning, they still face obstacles in implementing it in the classroom. This was also portrayed as a gap at the time of the initial research which was implied in an interview with a mathematics teacher at the State Junior High School 1 Manokwari. This study aims to describe the implementation of realistic mathematics learning in State Junior High School 1 Manokwari and examine the construction of mathematics teachers' perceptions of the meaning of realistic mathematics learning. As good student quality is manifested by good quality education (Haryono et al., 2018, p. 1), this research is expected to support the performance of mathematics teachers at State

Junior High School 1 Manokwari as an inseparable part. This research provides information and insight to teachers and researcher in implementing realistic mathematics learning in schools.

METHODS

This study uses a qualitative method with a phenomenological approach and was carried out for 1 month and involved mathematics teachers and students of State Junior High School 1 Manokwari. This study uses observation, interviews, and documentation techniques to explore perceptions and implementations of realistic mathematics learning. Documentation was carried out on lesson plans and student worksheets, while observations were carried out during the mathematics learning process in class to see the suitability of planning and implementing realistic mathematics learning. Interviews were conducted with mathematics teachers of State Junior High School 1 Manokwari to confirm and collect all information about teachers' perceptions in designing and implementing realistic mathematics learning in the classroom.

The data analysis in this study was adapted from Clark Moustakas (1994) as cited by Hadi (2021, pp. 27–28) as follows: The researcher recorded all expressions from the documentation of lesson plans and student worksheets, observations of mathematics learning in class VII, VIII, and IX, and teachers' answers from the interviews. The researcher delete or eliminate expressions that have been recorded before for further themes or labels. The researcher grouped and described the themes of expressions that were consistent, unchanging, and had similarities from the mathematics teachers of State Junior High School 1 Manokwari. The researcher validate expressions by labeling previously grouped expressions and themes. At this stage, the data from documentation, observations, and interviews are seen to be similar or have similar implementation tendencies. The researcher made an Individual Textural Description (ITD) by presenting validated expressions according to the theme, supplemented with verbatim quotes from the interviews.

RESULTS AND DISCUSSION

Ideal learning will make students gain mastery of concepts from the learning process. Realistic mathematics is a learning approach that uses mathematical problems in everyday life, making it easier for students to accept material and provide direct experience with their own experiences. Hulukati (2014, p. 30) states that in studying mathematics, it is necessary for students to have experience in discovering various mathematical concepts or principles under adult guidance. In implementing realistic mathematics learning, the mathematics teacher of State Junior High School 1 Manokwari must comply with the rules. The rules in designing realistic mathematics learning are the suitability of learning objectives, material selection, student activities, and learning evaluation.

Research documentation was conducted to see how teachers' plan before implementing realistic mathematics learning in the classroom. The things that are documented are the Lesson Plan (RPP) and Student Worksheets (LKPD). The two aspects describe the teacher's plan in preparing realistic mathematics learning. The aspects observed in the RPP and LKPD are the completeness of the lesson plan components and the representation of the "real" meaning in its design. Documentation on mathematics learning plan at State Junior High School 1 Manokwari is presented in the following table.

In addition to the lesson plan, mathematics teachers at State Junior High School 1 Manokwari also prepare student worksheet as a learning evaluation tool. Teacher G1, G2, G3, and G4 prepare student worksheet according to their respective learning objectives stated in the designed lesson plan. Teacher G1 uses a kite as an object that students have seen or even played with in formulating mathematical problems. This worksheet is discussed in group after the material is given first. Teacher G2 and G3 adapt the questions

from the textbook in the designed student worksheet. questions must be answered individually. Meanwhile, Teacher G4 provides questions that are adapted from textbooks but still maintain the contextuality of objects that can be understood by students. Teacher G4 uses teaching aids or learning media to help students work on a given project. This project is done in groups and presented in front of the class. This student worksheet design difference affects the perception of each teacher on the realistic mathematics evaluation.

Table 1. Research documentation results

Observed aspects	Teachers			
	G1	G2	G3	G4
Complete module/RPP components	√	√	√	√
Components of LKPD	√	√	√	√
Evaluation rubric in the LKPD	√	×	×	×
Realistic representation on modules/RPP	√	√	√	√
Realistic representation on LKPD	√	√	√	√

Figure 1. Tube and cone teaching aids

Not only the construction of learning plans are different, in terms of implementing realistic mathematics learning in the classroom, teachers G1, G2, G4, and G4 show different ways. Teacher G1 uses kites and examples of simple flat shapes in the student's world to lead students to understand the concept of a rhombus and a kite formally. Teacher G2 uses open-ended questions to explore students' experiences related to flat shapes. Teacher G2 asks things that have been seen, used or touched related to the triangle material being taught. Teacher G3 also uses open-ended questions to find different answers from students. At this stage, Teacher G3 provides real examples based on the answers given by students. The example given is something that has not only been seen by students, but can be imagined by students. Meanwhile, Teacher G4 emphasizes learning media/learning teaching aids as the real meaning in the learning process. The media provided as practice materials in the realistic mathematics praxis in the classroom helps students to use their experience and mathematical knowledge to find formal mathematical concepts. Examples of teaching aid given by teacher G4 is presented in the following figure 1.

Planning and implementation of realistic mathematics learning in class VII, VIII, and IX of State Junior High School 1 Manokwari cannot be separated from the construction of mathematics teachers' perceptions of realistic mathematics learning. Observations, documentation, and in-depth interviews with mathematics teachers obtained information related to differences in teachers' perceptions of realistic mathematics learning. The construction of the perception of realistic mathematics learning starts from the teachers' prior knowledge. The interview results show that not all teachers understand and implement it in the classroom. This is illustrated in the following interview excerpt:

Researcher: Have you ever heard of or know about realistic mathematics learning?

Teacher G1: “I have never heard of realistic mathematics learning. Maybe realistic mathematics means mathematics that is linked to the real world.”

Teacher G2: “I am quite familiar with realistic mathematics learning because I was taught in

college, but I do not understand how to design the lesson."
Teacher G3: "I often hear it but do not understand how to implement this learning in the classroom."
Teacher G4: "I have heard and know about realistic mathematics learning before."

The results of the interview above serve as a starting point for further investigation regarding the perception of the mathematics teacher at State Junior High School 1 Manokwari towards realistic mathematics learning. Furthermore, observations in class strengthen the perception of each teacher in relation to the implementation of the realistic mathematics syntax. Teacher G2 emphasizes giving real examples that are around students when carrying out mathematics learning. Teacher G1's perception of realistic mathematics learning is that the learning prioritizes the use of real examples. Observations of learning mathematics in class VII show that teacher G1 only uses real examples that students can observe. The questions given are about students' knowledge of the shapes of squares, rectangles, triangles, rhombuses and kites.

Teacher G2 adds that the examples given are not only those that have been observed but also those that have been touched. Teacher G2 understands that what someone has seen and touched will be easier to remember. According to Teacher G3, in carrying out mathematics learning in the classroom, students must be the center of learning and the teacher must provide examples that are not only real but also examples that can be imagined by students. Ali cites research by Sulastri (2017, p. 21) which states that at the stage of child development with the age of approximately 12 years, junior high school students have been able to use symbols of thinking, and think abstractly. Meanwhile teacher G4 argues that the use of media or teaching aids is needed in learning realistic mathematics in the classroom. Contextual issues and problems originating from everyday life can be proposed by the teacher as discussion material until students find formal mathematical concepts (Nopiyani et al., 2018, p. 49).

The differences above are the result of the construction of perceptions that depart from different thoughts. With this divergent perception and the absence of assistance from the school or professional parties to teachers at State Junior High School 1 Manokwari, the differences continue to the interpretation stage in the classroom. The realistic meaning by the mathematics teacher of State Junior High School 1 Manokwari is presented in the table 2.

Based on the interview excerpts above, the researcher concludes that there are several important points. The first point of realistic mathematics learning is considered as a real learning that brings mathematics closer to students. In addition, the second point is that realistic mathematics learning is considered as a learning approach where students are the center of learning and the teacher is the facilitator. The third point based on the interview above is that realistic mathematics learning is considered a learning process which students use their experiences to construct a formal mathematical concept. The fourth point is that realistic mathematics learning is seen as learning that uses teaching aids or learning media so that students can see and use these media to learn. Classroom management by mathematics teachers into small groups helps students to exchange information and assess knowledge from their friends' ideas and experiences before constructing a formal mathematical concept. Resti (2019, p. 22) states that the ideal group division is that its members range from 3-5 students, assuming that the group will be filled by three people with low, medium, and high ability levels, so that students can support and motivate each other. to learn. The selection of heterogeneous group members of 3-5 people can be seen based on the results of the pre-test given by the teacher (Pendy & Mbagho, 2020, p. 170). Students like to study in groups because they can learn from their peers without feeling awkward and embarrassed.

Table 2. Framework for analysis of interview data

Data	Initial Code	Category
Teacher G1: … a real learning… students are taught by something that is around students… examples are given by the teacher must also be around students so that students can easily… learn mathematical concepts.	Realistic mathematics meaning	Utilization of the learning environment
Teacher G2: ... real learning ... the examples given must also be real, which have been seen or touched by students ... for students to construct mathematical concepts based on what they have seen or experienced.	Realistic mathematics meaning	contextual examples that have been touched by
Teacher G3: … a learning approach where students are the center of learning. The teacher accompanies and facilitates learning … using things that are real or tangible … examples that can be imagined by students …	Realistic mathematics meaning	The center of learning is the students; the usefulness of students' experiences in learning mathematics; contextual examples that can be imagined in real terms
Teacher G4: … using real or real things … using all their experiences … using media or teaching aids … things they can imagine in real life;…	Realistic mathematics meaning	Using media or teaching aids; the use of contextual problems that can be imagined in real

The construction of different perceptions is also the impact of how teachers construct realistic mathematics learning from themselves. One of the triggers for different teacher understanding is the involvement of the school or related parties in providing understanding and assistance in making the lesson plans and student worksheets. The results of the interview showed that while designing realistic mathematics lesson plans and worksheets, the mathematics teacher of State Junior High School 1 Manokwari admitted that they had never been accompanied and given a comprehensive and sustainable understanding of how to design realistic mathematics lesson plans and worksheets. Therefore, mathematics teachers at State Junior High School 1 Manokwari implement realistic mathematics learning according to their respective perceptions.

Apart from differences in teachers' perceptions of realistic mathematics learning, there are similarities in several things, namely the use of contextual issues or problems in learning, media or teaching aids and *open-ended* to measure the level of students' understanding of the knowledge constructs they acquire in learning. It is in line with Sawada's statement in Wijaya (2011, p. 61) that students become more active in participating in learning and become bolder in expressing their ideas when teachers use open-ended problems in the learning process. In addition, the involvement of students in concluding learning together after learning activities is something that must be done before the teacher ends realistic mathematics learning at class. All the findings in this study prove that a person's perception affects the action of the object. By knowing the correct realistic mathematics learning context, mathematics teachers must be able to design and implement realistic mathematics learning with the correct syntax. The study and description of the construction of mathematics teachers' perceptions can be used as benchmarks for teachers and schools to evaluate mathematics learning.

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that

differences in teachers' perceptions of realistic mathematics learning resulted in differences in the implementation of realistic mathematics learning at State Junior High School 1 Manokwari. There are teachers with their perception as teachers who simply transfer mathematics directly by only giving real examples. There are also teachers who implement realistic mathematics learning complete with teaching aids and math problems that ignite the students' mathematization process. Even though they show differences in planning to evaluation of learning, there is a tendency to implement the principle of using contextual issues or problems that are friendly to students in interpreting realistic mathematics learning in the classroom. In addition, another tendency is that teachers do not understand the concept of realistic mathematics learning, as evidenced by the lack of use of demonstration methods in concretizing students' mathematical ideas and concepts.

The construction of the mathematics teacher's perception of State Junior High School 1 Manokwari towards realistic mathematics learning is influenced by information or initial knowledge about realistic mathematics, categorizing information, and interpretation in realistic mathematics learning tools. Based on their respective perceptions, mathematics teachers at State Junior High School 1 Manokwari interpret realistic mathematics learning in class in different ways. Teachers as facilitator help students learn and find formal knowledge holistically and continuously. This research proves that a perception is very influential on a series of decisions or certain actions. The interpretation is a reflection of the mathematics teacher's perception of realistic mathematics learning.

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REFERENCES

Agustrianita, A., Suherdi, D., & Purnawarman, P. (2019). Teachers' Perception on Students' Learning Style and Their Teaching. *Indonesian Journal of Curriculum and Educational Technology Studies*, *7*(1), 11–19. https://doi.org/10.15294/ijcets.v7i1.26727

Ainurrachmani, F., & Safaatullah, M. F. (2022). Mathematical Connection Ability In REACT Learning With RME Approach In Term Of Self-efficacy. *Unnes Journal of Mathematics Education*, *11*(1), 67–77. https://doi.org/10.15294/ujme.v11i1.55858

Astuti, R. P., Ahmadi, F., & Utanto, Y. (2022). Mathematic Comic Mobile Learning (MCML) for Class VII. *Innovative Journal of Curriculum and Educational Technology*, *11*(1), 28–37. https://doi.org/10.15294/ijcet.v11i1.55973

Fauziah, A., Putri, R. I. I., Zulkardi, & Somakim. (2018). Primary School Student Teachers' Perception to Pendidikan Matematika Realistik Indonesia (PMRI) Instruction. *Journal of Physics: Conference Series*, *943*(1), 1–8. https://doi.org/10.1088/1742-6596/943/1/012044

Gunadi, Haryono, & Purwanti, E. (2022). The Analysis of 21st Century Learning Implementation and Competency Achievement of Junior High School Students in 3T Regions. *Innovative Journal of Curriculum and Educational Technology*, *11*(1), 10–18. https://journal.unnes.ac.id/sju/index.php/ujet/article/view/

Hanafy, M. S. (2014). Konsep Belajar Dan Pembelajaran. *Lentera Pendidikan*, *17*(1), 66–79. https://doi.org/10.24252/lp.2014v17n1a5

Haryono, -, Budiyono, -, Subkhan, E., & Widhanarto, G. P. (2019). The Sufficiency of Basic Tasks and Functions of the Functional Position of the Educational Technologies in Schools. *Advances in Social Science, Education and Humanities Research, Volume 303*, 230–234. https://doi.org/10.2991/icpeopleunnes-18.2019.45

Haryono, Budisantoso, H. T., Subkhan, E., & Utanto, Y. (2018). Implementation Of Learning Quality Assurance Based On Applied Education Technology. *MATEC Web of Conferences*, *205*, 1–7. https://doi.org/10.1051/matecconf/201820500010

Hulukati, E. (2014). *Matematika Realistik* (1st ed.). Deepublish.

Isdiarti, F., & Man, S. (2018). Design Development Learning Media Based PMRI Oriented Capabilities Study Creative Students Grade VII of Junior High School in Indonesia. *International Journal of Engineering & Technology*, *7*(4.30), 50–52. https://doi.org/10.14419/ijet.v7i4.30.22004

Iskandar, Bayu; Haryono; Utanto, Y. (2019). Mathematic Score of the Champions. *Innovative Journal of Curriculum and Educational Technology*, *8*(2), 78–89. https://doi.org/10.15294%0A/ijcet.v8i2.32642

Kemendikbud. (2019). *Hasil PISA Indonesia 2018: Akses Makin Meluas, Saatnya Tingkatkan Kualitas*. https://www.kemdikbud.go.id/main/blog/2019/12/hasil-pisa-indonesia-2018-akses-makin-meluas-saatnya-tingkatkan-kualitas

Mariana, N., Sholihah, S. A., Riski, R., Rahmawati, I., Wiryanto, W., Indrawati, D., & Budiyono, B. (2021). In-Service Teachers' Perception on Implementing Realistic Mathematics Education Approach in Their Best Practices. *Journal of Physics: Conference Series*, *1987*(1), 1–7. https://doi.org/10.1088/1742-6596/1987/1/012022

Maulana, M., & Man, S. (2018). Development of Students Worksheet based on Realistic Mathematics Education in Indonesia. *International Journal of Engineering & Technology*, *7*(4.30), 45–49. https://doi.org/10.14419/ijet.v7i4.30.22003

Nopiyani, D., Turmudi, T., & Prabawanto, S. (2018). Penerapan Pembelajaran Matematika Realistik Berbantuan GeoGebra untuk Meningkatkan Kemampuan Komunikasi Matematis Siswa SMP. *Mosharafa: Jurnal Pendidikan Matematika*, *5*(2), 45–52. https://doi.org/10.31980/mosharafa.v5i2.259

OECD. (2018). *PISA 2018: Programme For International Student Assessment (PISA) Result From PISA 2018*. https://doi.org/10.1787/acd78851-en

Pendy, A., & Mbagho, H. M. (2020). Model Pembelajaran Number Head Together (NHT) Pada Materi Relasi dan Fungsi. Jurnal Basicedu, 5(1), 165–177. https://doi.org/10.31004/basicedu.v5i1.542

Purwitaningrum, R., & Prahmana, R. C. I. (2021). Developing Instructional Materials on Mathematics Logical Thinking Through The Indonesian Realistic Mathematics Education Approach. *International Journal of Education and Learning*, *3*(1), 13–19. https://doi.org/10.31763/ijele.v3i1.178

Qiong, O. U. (2017). A Brief Introduction to Perception. *Studies in Literature and Language*, *15*(4), 18–28. http://www.cscanada.net/index.php/sll/article/view/10055

Rahmawati, R., Danaryanti, A., & Suryaningsih, Y. (2018). Penerapan Pendekatan Pendidikan Matematika Realistik Terhadap Kemampuan Pemecahan Masalah Matematis Di Kelas VII Program Kesetaraan Paket B Bumi Jaya. *EDU-MAT: Jurnal Pendidikan Matematika*, *6*(2), 218–227. https://doi.org/10.20527/edumat.v6i2.5686

Sachdeva, S., & Eggen, P.-O. (2021). Learners' Critical Thinking About Learning Mathematics. *International Electronic Journal of Mathematics Education*, *16*(3), 1–18. https://doi.org/10.29333/iejme/11003

Saefudin, A. A. (2012). Pengembangan Kemampuan Berpikir Kreatif Siswa dalam Pembelajaran Matematika dengan Pendekatan Pendidikan Matematika Realistik Indonesia (PMRI). *Al-Bidayah*, *4*(1), 37–48.

https://jurnal.albidayah.id/index.php/home/article/view/10

Sari, E. F., Nugraheni, N., & Kiptiyah, S. M. (2019). The Implementation of Blended Learning Based Realistic Mathematics Education in Mathematics Teaching. *International Journal of Innovation, Creativity and Change*, *5*(5), 353–361. https://www.ijicc.net/images/vol5iss5/Part_2/55201_Sari_2020_E_R.pdf

Septiksari, R. (2019). Penerapan Metode Team Games Tournament (TGT) Pada Mata Pelajaran IPA dalam Meningkatkan Prestasi Belajar Siswa. JEMARI (Jurnal Edukasi Madrasah Ibtidaiyah), 1(1), 21–29. https://doi.org/10.30599/jemari.v1i01.408

Subkhan, E. (2020). What is New on Curriculum Policy and How it Affects Curriculum Studies? *Indonesian Journal of Curriculum and Educational Technology Studies*, *8*(1), 59–63. https://doi.org/10.15294/ijcets.v8i1.38298

Sulastri, E. (2017). Peningkatan Hasil Belajar Biologi Melalui Penerapan Entry Behavior pada Materi Animalia di Kelas X.4 SMA Negeri 1 Bajeng Barat Kabupaten Gowa [Universitas Islam Negeri (UIN) Alauddin Makassar]. http://repositori.uin-alauddin.ac.id/id/eprint/4805

Uskono, I. V., Lakapu, M., Jagom, Y. O., Dosinaeng, W. B. N., & Bria, K. (2020). Pendekatan Pendidikan Matematika Realistik Berbasis Etnomatematika Dan Prestasi Belajar Siswa. *Journal of Honai Math*, *3*(2), 145–156. https://doi.org/10.30862/jhm.v3i2.126

Van den Heuvel-Panhuizen, M. (1996). *Assessment And Realistic Mathematics Education*. CD-β Pres, Center for Science and Mathematics Education.