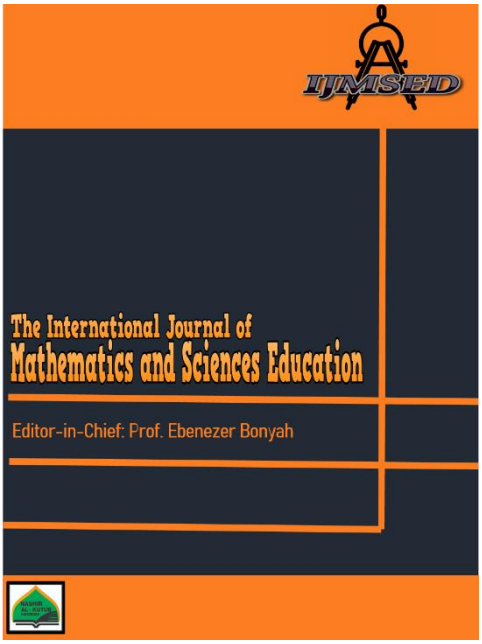
The International Journal of Mathematics and Sciences Education
Publication details, including instructions for authors and subscription information:
https://nakiscience.com/index.php/IJMSEd



Didactic design for learning social arithmetics based on islamic values at MTS Mu'allimat NW Anjani

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To cite this article:
Isnaini, S., Isnawan, M. G., & Shantika, E. G. (2024). Didactic design for learning social arithmetics based on islamic values at MTS Mu'allimat NW Anjani, *The International Journal of Mathematics and Sciences Education, 1*(2), 57-63.
To link to this article: https://nakiscience.com/index.php/IJMSEd

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Orginal Article

Didactic design for learning social arithmetics based on islamic values at MTS Mu'allimat NW Anjani

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Abstract
This study aimed to compile a didactic design on social arithmetic material based on learning obstacles and learning trajectories experienced by students when learning the concept. The research method used was a Didactical Design Research (DDR) method with data collection techniques, namely observation, interviews, and learning obstacle tests. The first step in this study was to identify learning obstacles by testing learning obstacle instruments on grade VIII A students, with a total of 18 MTs Mu'allimat NW Anajani students who had received and learned the material. Before the learning obstacle test, researchers first examined the composition of the selected material, namely social arithmetic, in existing source books. Identified, the next step was the preparation of a didactic design with the use of learning theories that were in accordance with the expectations of obstacles when the learning obstacle test could be overcome or reduced. The didactic design that had been prepared was then implemented for grade VIII A students, with a total of 18 MTs Mu'allimat NW Anajani students in the even semester.
Keywords: Learning obstacle, didactic design, learning trajectory, social arithmetic

1. Introduction

Results of the PISA test study conducted by the Organization for Economic Cooperation and Development (OECD). In 2018, Indonesian students achieved a score of 379 in mathematics from an international average of 500 points, which placed Indonesia in 72nd place out of 78 participating countries. This low level of mathematical competence is because students are not used to solving problem-solving questions such as in the PISA test.

The delivery of mathematics material is not simply done, but a teacher must design learning tools, such as teaching materials, which include using methods and approaches that are suitable for the material that will be presented in class later, as well as predicting students' responses when given an evaluation of the material. taught to create new situations.

Designing the flow of material is called learning trajectory, which we will abbreviate as LT. In providing material in class, teachers must not only pay attention to LT, but must also pay attention to the obstacles experienced by students in learning, which is called learning obstecle (LO), moreover. in social arithmetic material where students are required to understand problems presented in story form. According to Sulistiawati, Suryadi, & Fatimah, (2015:2) Brousseau suggests three types of learning difficulties or obstacles, namely ontogenic, epistemological and didactical obstacles that can occur in the learning process. Students often

complain about social arithmetic in the form of stories when working on the questions, even though this material is actually familiar because at the elementary school level students have received the same material but not in as much detail, at the junior high school level the material is deepened in social arithmetic and there is a diversity of questions. the form of the story is increasingly varied.

One way to reduce the obstacles experienced by students requires didactic design in social arithmetic material. Didactics can be divided into two, namely general and specific didactics. General didactics provides general principles related to the presentation of learning material. Meanwhile, special didactics talks about how to teach certain subjects where general didactic principles are used (Nasution, 2004, p. 2). According to Aisah, Kusnandi, & Yulianti, (2016:16) that Didactical Design is a learning design in the form of teaching materials created based on research on learning obstacles in mathematics learning that has emerged. This is reinforced by Nur'aeni & Muharam, (2016:210) stating that the meaning of didactic design is the design of teaching materials that pay attention to predictions of student responses.

Researchers in conducting their research conducted interviews with class VIII A students of MTs Mu'allimat NW Anjani. Based on the results of interviews with students, the problems at MTs Mu'allimat NW Anjani require the development of mathematics teaching materials based on Islamic values, including that many students do not like general lessons such as mathematics, because most students prefer religious lessons. . Students find mathematics lessons difficult, because there are many formulas that are difficult to understand, and MTs Mullimat NW Anajani is an Islamic-based madrasah but in general learning processes such as mathematics it has not been linked to Islamic values because there are no teaching materials that support these problems. This is in accordance with the opinion of Soleha and Rada (2011: 8) who state that Islamic education, especially those based on Islamic religious values, apart from instilling and forming an attitude of life that is imbued with these values, also develops knowledge abilities in line with Islamic values. what underlies it is a process of endeavor that is pedagogically capable of developing students' lives towards maturity or maturity that benefits them.

In essence, to understand mathematical material and solve mathematical problems in mathematics learning, students require quite high concentration. However, in the mathematics learning process it is not easy for students to achieve this concentration, because there will always be obstacles in learning mathematics. So researchers are interested in conducting research with the title "Didactical Design of Social Arithmetic Learning Based on Islamic Values". This research aims to determine the learning obstacles that exist in learning Social Arithmetic, and to find out how the didactic design of Social Arithmetic is based on Islamic values at MTs Mu'allimat NW Anjani.

2. Methods

The research was conducted at one of the MTs in NTB. The research used is qualitative research with a basis in didactical design research (DDR). Suryadi (2010:12), namely didactical situation analysis before learning which takes the form of a Didactical Hypothesis Design including ADP. Metapedadidactic analysis.

Retrospective analysis is an analysis that links the results of a hypothetical didactic situation analysis with the results of a metapedadidactic analysis. The steps used from the beginning of the research to reporting the research are identifying student learning obstacles and student characteristics. Repersonalize and produce new didactic designs (in the form of teaching materials). Predicting student responses is made in the learning plan that will be carried out. Implementing in the classroom, namely learning using new didactic designs. At this stage, it is done identification of learning obstacles and metapedadidactic analysis. Metapedidactic analysis is an effort to analyze the relationship between students and teaching materials (didactical relationship), and the relationship between teachers and students (pedagogical relationship), and predictions of student responses to the material (didactical and pedagogical anticipation). From the results of the metapedidactic analysis and retrospective analysis are used to revise the new didactic design.

Data collection in this research used two approaches, namely primary data and secondary data. Primary data in this research is the result of interviews with predetermined subjects. Meanwhile, secondary data in this research is in the form of good literature studies in the form of books, journals and other documents. The data collection technique is carried out using data triangulation techniques which include: Student learning obstacle identification tests, interviews, observation, documentation analysis. The data analysis technique is carried out before entering the field, while in the field, and after being in the field. In this research, data analysis is focused more during the process in the field along with data collection.

3. Findings and Discussion

Based on the results of the analysis, there are 3 main obstacles in the learning process.

Procedural Barriers

Based on interviews, it can be seen that students experienced procedural obstacles because they did not complete the questions until the last step because they were in a hurry to do the questions.

Conceptual Barriers

Based on the results of the interview, students do not understand the concept of social arithmetic and carrying out calculations without writing down the formula used first to shorten processing time.

Operational Engineering Barriers

Based on interview results that students cannot continue the calculations because they are constrained by the processing techniques and formulas used.

Based on the results of the analysis of learning barriers, the didactic design presented in this research is in Table 1.

Table 1
Alternative design

Learning Obstacle	Alternative Design
Conceptual	▪ Students do not stick to existing questions. ▪ Develop a mindset in working on a new problem. ▪ Students must also get used to writing formulas

Results of Analysis of Learning Barriers

Based on the results of the description of the research subject above, it shows that there are still epistemological obstacles faced by students. This shows that students feel difficulty in solving social arithmetic problems. This is in line with Susanti's statement that in solving story problems, students feel that they tend to be more difficult to solve than questions that only contain questions just numbers (Rahmawati & Permata, 2018). Epistemological barriers faced by students can vary because they are influenced by learning styles. When working on mathematics problems, there are different learning styles that influence the difficulties felt by students because each learning style has a different focus point (Ernawati et al., 2019). Visual learning style subjects experienced procedural and operational technical barriers, auditory learning style subjects experienced technical barriers only, and kinesthetic learning style subjects experienced conceptual, procedural and operational technical barriers. This is in line with Nuriza et al. (2019) that the errors that visual learning style students tend to experience are technical errors and lack of correct understanding of procedures, while the errors that auditory learning style students tend to make are incorrect mathematical calculations, and the mistakes that kinesthetic students tend to make are lack of understanding the problem, understanding the correct procedures, and inappropriate mathematical calculations.

Didactical Design for Social Arithmetic Learning Based on Islamic Values

The didactic design in learning social arithmetic based on Islamic values consists of three main activities, namely, initial activities, core activities, and finally closing activities. The didactic design was divided into 4 meetings with discussion at each meeting as follows: the first meeting was about selling price, buying price, profit, loss. The second meeting is about profit percentage, loss percentage. The third meeting focused on studying price cuts or discounts. The fourth meeting students will study taxes and simple interest. This didactic design focuses on helping students who are still at the potential development stage to enter the zone of proximal development (ZPD) until they reach the actual development stage and create independence in learning for students.

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(ZPD) until they reach the actual development stage and create independence in learning for students.

4. Conclusion

Learning obstacles identified in the social arithmetic material are obtained based on the results of student answers and interview results. The ontogenic obstacles found include: students experiencing procedural errors in answering social arithmetic material questions, students having difficulty in determining the formula to be used, students also experiencing difficulty in understanding story form questions, students who have not been able to carry out multiplication and division operations well as material precondition.

Didactical design developed based on student learning obstacles that arise from the identification of learning obstacles and student learning trajectories. This learning design is also equipped with a student activity sheet (LKPD). The didactic design is divided into 4 meetings with the discussion of each meeting as following: first meeting regarding selling price, buying price, profit, loss. The second meeting is about profit percentage and loss percentage. The third meeting focused on studying price cuts or discounts. The fourth meeting students will study taxes and simple interest. This didactic design focuses on helping students who are still at the potential development stage to enter the zone of proximal development (ZPD) until they reach the actual development stage and create independence in learning for students.

Based on the conclusions obtained, the author provides several suggestions regarding learning didactical design of the concept of tangents to circles, namely: the didactic design that has been prepared in this research can be used as an alternative learning design that can be used in social arithmetic learning activities; in implementing didactic design, it is recommended to choose a learning model that is in accordance with the didactical design that has been created so that learning is more effective; when preparing a didactic design, you must consider adequate learning time and adapt it to the learning design used; and this didactic design can continue to be developed with improvements and research, so as to obtain better research results and learning designs.

5. References

Aisah, L.S., Kusnandi, & Yulianti, K. (2016). Desain Didaktis Konsep Luas Permukaan dan Volume Prisma dalam Pembelajaran Matematika SMP. Mathline, 1(1).

Ernawati, E., Hadaming, H., Ramdani, R., & Ardhillah, A. (2019). Profil Kesulitan Mahasiswa dalam Menyelesaikan Soal Induksi Matematika Ditinjau dari Gaya Belajar. Delta-Pi: Jurnal Matematika Dan Pendidikan Matematika, 8(2), 14–22.

Nur'aeni, E., & Muharam, M. R. W. (2016). Desain Didaktis Konsep Mengukur Sudut di Kelas V Sekolah Dasar. Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika UNY.

Organisation for Economic Co-operation and Development.. PISA 2018: Science Competencies for Tomorrow's World, Executive Summary

(Online). (https://edukasi.kompas.com/read/2019/12/07/09425411/skorpisa-2018-daftar-peringkat-kemampuanmatematika-berapa-rapor-indonesia)

Sulistiawati, S., Suryadi, D., & Fatimah, S. (2015). Desain Didaktis Penalaran Matematis untuk Mengatasi Kesulitan Belajar Siswa SMP pada Luas dan Volume Limas. Kreano, Jurnal Matematika Kreatif-Inovatif, 6(2), 135-146.

Suryadi, D. (2009). Metapedadidaktik dalam Pembelajaran Matematika: Suatu Strategi Pengembangan Diri menuju Guru Profesional. Pidato Pengukuhan Guru Besar Universitas Pendidikan Indonesia, Bandung April 2009.