Character Education Values in Mathematics Story Problem Solving Activities in Elementary School

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Abstract
This study describes character values in mathematics learning. The purpose of the research is to describe the character values of independence, critical reasoning, and creativity. The type of research is descriptive qualitative. Data collection through: observation, questionnaires, and interviews. The result of the research is the activity of solving mathematical story problems raises character values, namely being able to: recognize and realize self-development needs; process, build links, analyze, evaluate, and conclude; and generate ideas and look for alternative solutions. The conclusion of the research is that learning mathematics on story problem solving material can build independent character values, critical reasoning, and creativity.

Keywords: Character education, mathematics, story problem

Abstrak

Kata kunci: Pendidikan karakter, matematika soal cerita

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INTRODUCTION

Professional competence for teachers needs to be improved to keep pace with advances in science and technology. Agus Dudung (2018) states that from various sources that discuss teacher competence, in general, it can be identified and summarized about the scope of teacher professional competence as follows: understand and can apply educational foundations both philosophical, psychological, sociological, and so on; understand and can apply learning theory according to the level of development of students; able to handle and develop the field of study that is his responsibility; understand and can apply various learning methods; able to develop and use various tools, media and relevant learning resources; able to organize and implement learning programs; able to evaluate students' learning outcomes; able to cultivate students' personalities.

Learners as social creatures need interaction with each other to improve their existence as creatures of God Almighty. The interaction of learners with learners and learners with teachers in the classroom is a means to build knowledge. This input provides an understanding for teachers to design learning by activating dialogs between students. Nahar (2016) explains that behaviorism learning theory is a learning theory that requires a teacher to provide stimuli as a stimulus to children and the results of these stimuli can be observed and measured based on the aim to see whether there is a significant change in behavior. Interaction can lead to various interpretations, both negative and positive. This condition is the same as learners interpreting a statement from an everyday problem. Statements in logic are expressed as sentences that already have a truth value, either true or false but not both. Because it already has a truth value, the interpretation made by students can be categorized in two ways, namely: fully understanding the meaning followed by the ability to model mathematics; and not being able to fully understand the meaning, so they cannot proceed to mathematical modeling. This is confirmed by Catani and Leifer (2023) who state that in solving math problems in the form of story problems which contain many numbers and number operations, making the level of difficulty of students even higher. This is due to the lack of understanding of the concept from the beginning in students.

Muhammad & Angraini (2023) state that mathematics is a cognitive ability that needs to be developed in every student because it is closely related to problem solving involving the relationship between number symbols and the cognitive activities of students. From the description above, the definition of mathematics in general is a field of science whose studies include topics such as numbers, formulas and related structures, the buildings and spaces in which they are located, and quantities and their changes.

Based on the above understanding, it can be understood that learning mathematics is gradually building mathematical concepts and continued with the application to solve everyday problems. The form of application of mathematical concepts to solve problems in everyday life is realized in the form of story problems. Sukoco (2023), shows that students' ability to solve problems in operational number material is still lacking. This can be seen from the presence of students who have not been able to understand well the mathematical sentence modeling in the problem. Students cannot make a solution plan in advance in solving problems and the answers given by students are less precise. To solve this problem, learning is done in the form of problem-based learning (PBL).

Learning in the 2022/2023 academic year several public elementary schools use the Merdeka curriculum. In its implementation, Giriroto 1 State Elementary School (SD) in grade V, learning mathematics after the basic concepts are taught, the teacher provides story problem material. Lumbantoruan and Nadeak (2022) stated that the difficulty lies in teachers who have pedagogical competence with minimal learning tools.
and professional competence, unable to explain concepts in the media and not assisted by self-made modules. This makes students’ understanding less understandable. The implementation of learning to explore story problems, in addition to seeing the level of cognitive development through learning outcomes, is also aimed at building the profile of Pancasila students. The dimensions that are considered are the dimensions: independent, critical reasoning, and creative. In order to see the emergence of these dimensions, teachers design learning in groups.

The results of research from Syamsudin, et al. (2021) with the title Mathematics Learning Interest of Students Based on the Difference in the Implementation of the Model of Thematic Learning and Character-Integrated Thematic Learning, explain that the integration of thematic learning with character education can be applied to pay attention to the development of students' characters which has an impact on increasing students' interest in learning. This is because the integrated learning model is a form of teacher support in increasing student involvement in learning in the classroom. The involvement of students in the mathematics learning process opens up opportunities for learner-centered learning and exploration to occur. These two things support the development of students towards creativity in finding solutions, critical reasoning in formulating and modeling mathematics, and independence in making policies.

Research from Nirfayanti, et al. (2022) with the title: Ability to solve mathematics questions with cooperative integrated reading and composition learning model. The purpose of the study was to determine the ability to solve math story problems using the Cooperative Reading Comprehension and Composition (CIRC) cooperative learning model. The result of the research is the ability to solve math story problems using the Cooperative Reading Comprehension and Composition (CIRC) cooperative learning model is better than the conventional learning model. This is because students are given time to understand the context of mathematical problems by being given the freedom to explore the data, provide various concepts of completion according to the ability of students, and foster self-confidence in students.

Research from Mahmudah (2015) with the title: Improving Skills in Solving Math Story Problems Using Working Card Media for Second Grade Students of SDN Purworejo, Kandat District, Kediri Regency. The results of his research are the use of work card media can improve skills in solving math story problems. The research provides learning with a learning and play model, because the model is suitable for the class under study. This learning concept builds the character value of critical reasoning because it provides many opportunities for students to think about providing solutions to solving steps.

The results of research from Judijanto, et. al. (2023) with the title Elementary School Students' Effectiveness towards Improving Mathematics Learning Outcomes in Additional Material. The results of his research show that attitudes, habits, and anxiety have a positive and significant relationship to math learning. This confirms that character values have a good correlation to achievement in this case the cognitive development group. So it can be concluded that character values are able to lift learning outcomes well because mathematics also has character values.

The results of research from Agusti, et. al. (2018) explain that learning mathematics using Congklak shows that there are nine character values contained in the Congklak game after being used as a medium for learning mathematics. The nine character values are honesty, discipline, hard work, creativity, curiosity, independence, communicative, responsibility, and respect for achievement. The results also prove that the use of learning media in the form of traditional congklak games can be used as an intermediary that can be used by teachers in the process of learning mathematics. In addition, this study shows that although the game of congkak is included in the traditional game among the middle class, it turns out that there are character values that are scientifically researched. This confirms that learning by using group games...
provides learning in the form of exploration and is learner-centered. Thus, it can be concluded that learning mathematics with the concept of play and learning can foster character values in students.

Based on the description above, through the media story problems in learning mathematics carried out with teamwork can develop independent dimensions, critical reasoning, creativity in students in grade IV, then researchers can formulate problems: How can story problems through group work in math learning develop independent, critical reasoning, and creative dimensions? While the purpose of this study is to describe the development of independent character, critical reasoning, and creativity through story problems whose stages are through group work in learning mathematics in class IV at Giriroto 1 State Elementary School, Ngemplak sub-district, Boyolali district.

METHOD

The type of research in this article is qualitative with a descriptive case study research strategy approach. The definition of qualitative research type explained by Sugiyono (2019: 18) is a research method based on the foundation of the Post Positivism philosophy, studied in scientific conditions (experiments), researchers act as instruments, and data is analyzed with qualitative properties that focus on emphasizing meaning. Noting the above understanding, the researcher in this case did not intervene with the research subject.

The research began from January to May 2023, at Giriroto 1 State Elementary School (SD), Ngemplak sub-district, Boyolali district. The research flow in this article is described as follows:

![Figure 1. Research Flow of Character Development Through Story Problems](image)

Mathematics story problems containing problem solving material from everyday life in the environment of fourth grade students of SD Negeri Giriroto 1, Ngemplak sub-district, Boyolali district, are carried out with group work oriented to the dimensions of the Pancasila learner profile. Group work that is applied is with stages: group formation, group evaluation, individual work, and individual evaluation. Meanwhile, the dimensions of the Pancasila learner profile observed in this study are the emergence of students' attitudes or behaviors from the dimensions of independence, critical reasoning, and creativity. To see the emergence, researchers used elements and sub-elements of the three dimensions.

The research subjects were teachers and fourth grade students of Giriroto 1 State Elementary School, Ngemplak sub-district, Boyolali district. The main data source is the document of math learning process, while the supporting data are texts and
informants. Data collection techniques were observation, literature study, and in-depth interviews with informants.

The degree of trust is an activity to describe the results of research on the actual object description. Moleong (2019: 48) states that techniques to test the degree of trust can be through: extension of participation, persistence of observation, triangulation, peer checking, adequacy of reference, negative case analysis, member checking. The technique used to test the degree of trust in this study is Triangulation. Data in the form of documents are validated through matching techniques with class IV teachers, while the results of interviews are validated with repeated interview techniques.

The data that has been entered is then analyzed, synthesized, and given meaning. Afrizal (2015) explains that the definition of analysis is an activity in the process of processing basic data which is still in the form of actions, narrations, field notes, and written materials that support research, so that it can be interpreted. The stages of analyzing data using Miles and Huberman (Afrizal, 2015) which explains that the stages of analyzing qualitative research data are data reduction, data presentation, and drawing a conclusion.

RESULTS AND DISCUSSION

The implementation of mathematics learning to see the emergence of independent, critical reasoning, and creative dimensions through story problem material is carried out using the group method. Radno Harsanto (Suharni, 2020) stated that learning in a group can increase the value of cooperation, cohesiveness, active student participation, student intimacy, academic ability, self-confidence, and basic skills.

Agustyaningrum, Pradanti, and Yuliana (2022) explained that Piaget's cognitive development theory, the thinking stage of students in elementary school is generally at the concrete operational stage. Furthermore, the recommended mathematics learning is student-centered and active learning, such as discovery and contextual learning methods. The learning carried out by this grade IV teacher is included in the learner-centered group. This can be seen from the learning stages. Mathematics learning with math story problem material is carried out with the following stages: 1) Form small heterogeneous groups. 2) The teacher gives an example of the steps of mathematical modeling followed by asking a sparking question. 3) The teacher gives two story problem materials for students to discuss in their groups. 4) Learners try to model mathematical story problems. 5) The teacher gives the answer to the first story problem material. The second one is given to the learners. 6) The teacher gives 2 math story problems to each group. 7) The teacher gives time to the learners to work. 8) The math story problems are transferred to another group. 9) After enough time, the work is exchanged for correction. 10) Each group is asked to make a math story problem and give it to another group. 11) After completion, the work is handed back to the group making the problem for correction.

Observation data shows that:

<table>
<thead>
<tr>
<th>Table 1. Learning Implementation Observation Results</th>
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280
<table>
<thead>
<tr>
<th>No.</th>
<th>Dimension/Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Independent</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Self-understanding and the situation at hand</td>
<td>Group activities gradually foster the courage to step up in solving story problems.</td>
</tr>
<tr>
<td>1.2</td>
<td>Self-regulation</td>
<td>After the learning outcomes and success in solving math story problems, some learners dare to come forward to demonstrate and give feedback.</td>
</tr>
<tr>
<td>2.</td>
<td>Critical Reasoning</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Acquire and process information and ideas</td>
<td>Each question is read with the target of understanding and immediately providing a form of response to provoke the release of ideas for each team member.</td>
</tr>
<tr>
<td>2.2</td>
<td>Analyzing and evaluating reasoning</td>
<td>Mathematical material is responded to by appearing various possible solutions but immediately being able to provide a form of solution.</td>
</tr>
<tr>
<td>2.3</td>
<td>Reflecting and evaluating one's own thinking</td>
<td>Learners dare to try the form of solution, if finished there is a consulted with the teacher, who is already firmly seen always conferring to ask members &quot;which one does not understand&quot;</td>
</tr>
<tr>
<td>3.</td>
<td>Creative</td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Generates original ideas</td>
<td>Learners dare to come up with ideas to start the first step in solving the problem.</td>
</tr>
<tr>
<td>3.2</td>
<td>Produce original works and actions</td>
<td>The results of the ideas are poured into the stages of completion and mutually discussed to find the truth</td>
</tr>
<tr>
<td>3.3</td>
<td>Have flexibility in thinking in finding alternative solutions to problems</td>
<td>Learners contribute to each other according to their abilities and accept each other's input and criticism</td>
</tr>
</tbody>
</table>

Data from interviews with teachers and learners, as follows:

1) Teachers are happy and proud that the learning method for solving math story problems is carried out with a medium group of 4 students, then 2 students, and finally learning individually. The concept of this method has many benefits, especially to build independence, courage to argue, and have their own way according to their abilities. This is stated in the interview with the teacher who mentioned that:

"... learning groups gradually leading to individuals provides many benefits ... students imperceptibly develop their independence... initially shy not daring to express opinions... but when group 4 began there was a stimulus to appear to give ideas... when the group is only 2 ... dare to ask questions... correct the statements of friends, en... and when individual can correct the whole class...."

2) Learners feel happy learning math in groups because they dare to speak up, express ideas, dare to try answers, and finally dare to blame or justify the answers of friends in one group. When alone, they dare to come forward and dare to answer. This is evidenced by the results of interviews with students who said:

".... I really like learning in groups..because..at first I couldn't..but continued to pay attention to my friend's explanation,. the courage to express ideas ..but wrong,.yes not embarrassed..but finally able to start with the right ideas..can come forward to explain and answer...yes..can also finally give corrections to friends' answers are right or wrong .."
The results of the questionnaire calculation of the observation of the emergence of character values are the results of the calculation of character values from: the independent dimension, namely 17 out of 20 students (85%) are able to recognize and realize their development needs in accordance with changes and developments that occur; the critical reasoning dimension, namely 16 out of 20 students (80%) are able to process information, build links between various information, analyze information, evaluate and conclude; the creative dimension, namely 14 out of 20 students (70%) are able to generate ideas and actions in finding alternative solutions to problems.

Pembahasan

Learning mathematics through story problems in addition to providing cognitive development progress, can also be a medium for developing the character of students. Mustika Abidin (2022) explains that interactive learning is based on behaviorism learning theory which views learning as a process of behavior change as a result of the interaction between stimuli (stimulus) and responses (response). This theory prioritizes measurement, because measurement is an important thing to see whether or not there is a change in behavior. Measurement for the character uses indicators from the elements and sub-elements of the Pancasila learner profile. This is in line with Syamsudin, et al. (2021) that the integration of thematic learning with character education can be applied to pay attention to the development of students' characters which has an impact on increasing students' interest in learning. These two things support the development of students towards creativity in finding solutions, critical reasoning in formulating and modeling mathematics, and independence in making policies.

Nurdyansyah, F., Muflihati, I., Ujianti, R. M. D., Novita, M., Kusumo, H., & Ryan, J. C. (2022) stated that a systematic review was conducted of the relevant P5 database from the perspective of Merdeka Curriculum. There is strong evidence to suggest that forming small groups of teachers with a coordinator and facilitator is important. They will be responsible for planning, implementing and evaluating P5. This systematic review is potentially important, so that learning mathematics with math story problem material needs to relate to the elements in the Pancasila learner profile. The emergence of independent, critical reasoning, and creative dimensions, the teacher makes an activity questionnaire table. This linkage is in accordance with the explanation of Polya (Rizki Wasia, Gustimal Witi, and Zariul Antosa (2020) Indicators of the ability to solve story problems: 4 1) Ability to write known aspects, 2) Ability to write down the aspects that are asked, 3) Ability to solve mathematical models, 4) Ability to draw conclusions. This is also supported by the results of research from Agusti, et. al. (2018) which states that group learning is able to foster character values, such as: honesty, discipline, hard work, creativity, curiosity, independence, communicative, responsibility, and respect for achievement.

Learning math with story problems that are done with groups is cooperative learning. Warsono & Hariyanto (Ismun Ali, 2021) state that cooperative learning is a learning method that involves a number of small groups of students to work together and learn together by helping each other interactively to achieve learning objectives that have been formulated. Cooperation between students in one group provides space and time to help each other in formulating or modeling mathematics, composing mathematical story problems, correcting answers from other group students, is a form of realization to be independent. This is also emphasized in his research from Judijanto, et. al. (2023) which states that the value of attitudinal character and habituation managed through learning in groups and giving students space to explore will be able to lift math learning outcomes.

Mathematics story problems are a stage to apply problem solving in the learner’s environment. This application is possible because mathematics is knowledge that
involves logic. This is confirmed by Courant, R (2019) who states that mathematics is a science that develops from the investigation of the quantification of relationships between various things involving certain concepts and methods. Based on some of the above opinions, it can be concluded that mathematics is a science that involves logic and deduction to study abstract relationships and patterns in objects and certain procedures. This math learning is able to develop student thinking, namely: logical, critical, thorough, curiosity, perseverance, etc.

Group learning gives learners time to interact with others. This is because safe learners now have more energy. So that safe learners are now dynamic. Li & Xue (2023) explained that dynamic learners are learners who are active, energetic, and always on the move. They not only receive knowledge from the teacher, but also participate in the learning process. They are always active in asking questions, finding out, and discussing the topics being studied. Dynamic learners tend to have high interest and motivation towards learning, so they often try various ways and strategies in order to master the subject matter. They are not afraid to try new things and are happy to take the risks involved in the learning process. In addition, dynamic learners also often have many activities outside of school, such as extracurricular activities, sports or organizations that show their activeness and desire to be involved in various activities.

Training participants to have a critical reasoning dimension, learning mathematics by solving math story problems has been proven to train students to reason critically. Arisoy & Aybek (2021) Mathematics is one way to improve thinking and there are many other ways in common with critical thinking. In context, the purpose of this study is to examine the impact of subject-based critical thinking education in mathematics on students' critical thinking skills and critical thinking virtues. This is evident from the results of the questionnaire processing which states that through math story problems obtained 80%. This can be interpreted that learning mathematics with math story problems and done in the form of groups, can be said to be successful.

Learning math by using math story problems requires its own skills. This means that teachers who dare to teach math story problems can be sure that the teacher has professional competence. Pham (2023) explains that a professional teacher is a teacher who has a teaching qualification that is in accordance with the subject he teaches. In addition, he has the ability and expertise in the field of education and is able to understand the needs and peculiarities of students. Professional teachers also have a sense of responsibility to continue to develop themselves through appropriate training and courses in order to provide the best teaching to their students. In addition, a professional teacher must have a good work ethic and be able to interact well with everyone involved in the education process, including students, parents and colleagues.

Learning mathematics with math story problems and done in groups can be said to be the same system as the Pancasila student profile activation project (P-5). This is because students investigate, solve problems, and make decisions Utari, D., & Afendi, A. R. (2022) explained that project learning, planting and developing the character of mutual cooperation and creativity in students can be implemented. The use of project-based learning in this lesson is also expected to overcome the problems experienced by children including: 1) have low achievement, 2) have low memory, 3) pay less attention, 4) have a slower learning speed than other friends. 5) need more stimulation to do the task and 6) experience adaptation and social relationship problems in the classroom.

CONCLUSION

The results showed that the activity of solving mathematical story problems raised character values from: the independent dimension, namely 17 out of 20 students
(85%) were able to recognize and realize their development needs in accordance with changes and developments that occurred; the critical reasoning dimension, namely 16 out of 20 students (80%) were able to process information, build links between various information, analyze information, evaluate and conclude; the creative dimension, namely 14 out of 20 students (70%) were able to generate ideas and actions in finding alternative solutions to problems.

REFERENCE


