

Analysis of Teachers' Creativity in Designing and Managing Mathematics Learning in Primary School

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Abstract

Creativity is an important competency that teachers must have to support effective learning. This study describes teachers' creativity in designing and managing mathematics learning in elementary school grades 1, 2, and 3. The research uses a descriptive qualitative method involving 3 teachers and 25 students. Data is collected through interviews, observations, and document analysis. The study results show that each teacher applies different creativity according to students' needs and character, positively affecting motivation and learning outcomes. Creativity can be seen in planning teaching materials, classroom management, and learning methods. The results of the midterm exam and motivation questionnaire showed a significant improvement. This research emphasizes the importance of discussion and collaboration between teachers to develop innovative ideas in mathematics learning. The practical implication is that schools need to support teacher training to increase creativity so learning is more interesting and effective in helping students understand the material.

Keywords: *Teacher creativity; mathematics; designing; managing, mathematics, elementary school*

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Introduction

Teachers' creativity is important because it plays a direct role in designing and managing learning that is effective, engaging, and relevant to student needs. Align with Anggraeni (2021); Siswanto et al. (2021); Izomi. (2022) Explained that creative teachers can utilize various learning strategies that are modified or adapted to the needs of students, thereby creating a learning experience that is enjoyable and supports a significant improvement in learning outcomes. Wahdaniah et al. (2017) and Nur et al. (2021) Explained that teachers' creativity can create a fun learning atmosphere, motivate students to be more actively involved in learning, and encourage the achievement of learning goals. In mathematics learning, creativity is indispensable to overcome challenges such as low interest in learning students or the assumption that mathematics is a difficult subject.

Teachers' creativity is an important issue in mathematics learning at the elementary level because this lesson is often seen as difficult by students, due to the monotonous and uninteresting learning atmosphere (Manik et al. 2020; Widia et al., 2020; Warsini, 2021). In addition, low interest in learning mathematics is often associated with using learning methods less relevant to student needs. This challenge underscores the importance of teachers to design learning with a creative approach, including in planning teaching materials, classroom management, and selecting a variety of learning methods. For example, teachers can use visual aids, educational games, or interactive digital platforms to facilitate a gradual and engaging understanding of math concepts.

In the digital era, teachers' creativity is becoming increasingly relevant because technology allows for more innovative and interactive material delivery. Creative teachers are able to integrate technology in learning to create interactive media that supports the diversity of students' learning styles. In this way, students are not only actively involved in learning, but can also more easily understand the concepts being taught (Novianti & Primana, 2022; Fitriyani, 2021; Muis et al., 2022). Teacher's creativity is the ability to develop new ideas or innovative solutions in delivering learning materials, so that students can understand concepts more easily and attract their interest (Novianti & Primana 2022; Wondal et al., 2022; Kurnia., 2015; Widia et al., 2020).

Creative teachers can implement a variety of learning strategies that are modified or created according to students' needs, which not only creates an enjoyable learning experience but also supports the effective achievement of learning goals (Anggraeni, 2021; Partono et al., 2021; Pentury, 2017; Wahdania et al., 2017). In addition, creativity also helps teachers create a dynamic learning atmosphere, so that students feel motivated to continue learning and develop their potential (Amaliyah & Rahmat, 2021; Supriadi, 2018; Partono et al., 2021; Ayu et al., 2019, Budiarti, 2015). With creativity, teachers can design learning approaches that are more interesting, varied, and relevant to students' daily lives. Teachers can present innovations in managing learning such as the delivery of material that not only improves understanding but also fosters active student involvement in the learning process so that it is able to change the perception that mathematics is a complex subject into a fun and meaningful learning experience.

Previous research has provided insights into teachers' creativity in a variety of contexts. Murni et al. (2023) highlighting innovations in the creation of mathematics learning media in teacher working groups, but the focus is limited to aspects of learning media, without exploring other aspects such as classroom management or learning methods. Murdiana et al. (2020) discusses teachers' creativity in mathematics learning in general, but does not explain the level of education studied, so that the results are less specific to be applied. Meanwhile, Rezki & Rivilla (2024) Examining teachers' creativity at the madrasah level, which does not cover the basic education level. This study shows the importance of further exploration related to teachers' creativity at the elementary level, especially in designing learning that is adaptive to the needs of students with diverse characters.

The novelty of this study lies in a thorough analysis of teachers' creativity in mathematics learning in grades 1, 2, and 3 of elementary schools, focusing on three main aspects: (1) planning and preparation of teaching materials, (2) classroom management, and (3) the application of various learning methods. This study aims to describe teachers' creativity in planning and preparing teaching materials, classroom management, and the application of learning methods, as well as how this creativity can increase students' learning motivation and learning outcomes in mathematics learning. Thus, this research is expected to make a theoretical and practical contribution to improving the quality of mathematics learning at the elementary school level, so that it is more interesting, relevant, and supports the development of students' abilities as a whole.

Method

This study uses a qualitative approach with a case study design. According to Sugiyono (2017) Qualitative research aims to provide an overview of the data as it is without manipulation, so that the results can describe the phenomenon in depth. The case study design was chosen because it allows researchers to focus on analyzing teachers' creativity in mathematics learning in more depth, especially in planning teaching materials, classroom management, and the application of learning methods in elementary schools.

The research was conducted at SD Inpres 12 Prafi with research subjects consisting of 3 teachers of grades 1, 2, and 3 and 25 students from the three classes. Subject selection is based on inclusion criteria, namely teachers who have taught for at least two years and are active in

professional development activities such as training or workshops, and students who participate in mathematics learning regularly in the classroom. The selection of this subject is carried out to ensure the relevance and quality of the data obtained.

Data were collected through three main techniques: interviews, observations, and documentation studies. The interview guide is designed to explore information about teachers' creativity in designing teaching materials, classroom management, and the application of learning methods. Observation sheets are used to systematically record learning activities in the classroom, such as teacher-student interaction and the use of learning media. Documentation studies involve the analysis of learning implementation plans (RPP), teaching materials, and student learning outcomes. The validity of the instrument is maintained by testing interview guides and observation sheets through expert judgment, involving lecturers who are experts in mathematics education.

Data analysis was carried out using the Miles & Huberman interactive analysis model, which consisted of three stages: data reduction, data presentation, and conclusion drawn. This process is carried out repeatedly until the data reaches saturation (Sugiyono, 2017)). Triangulation is used to ensure the validity of the data, by comparing results from various sources (teacher interviews, classroom observations, and learning documents) as well as using several data collection techniques. For example, information about teachers' creativity in managing the classroom obtained from interviews is verified through the results of observations in the classroom and lesson plan documents. With this systematic approach, the research is expected to provide an accurate and in-depth picture of teachers' creativity in mathematics learning in elementary schools.

Results and Discussion

Teachers' creativity is one way to help students understand the material taught to them. The methods used by each teacher are different in helping students learn. In this study, teacher creativity is seen from the teacher's ability to design and prepare teaching materials, manage the classroom, use various methods, creativity in utilizing learning media and be creative in conducting evaluations. The forms of creativity carried out by each teacher in improving students' motivation and mathematics learning outcomes are as follows:

Teachers' Creativity in Planning and Preparing Teaching Materials

The thing that a teacher must have when he wants to teach is to design and prepare teaching materials so that the learning carried out is more optimal. The following is a table that summarizes the creativity of learning planning from teachers in grades 1, 2, and 3 based on the results of interviews:

Table 3. Teachers' Creativity in Planning and Preparing Teaching Materials

Class	Teacher Creativity	Learning Planning & Preparation	Materials taught	Media
1	Create PowerPoint Presentations (PPT) using Canva App	Making a Learning Implementation Plan (RPP)	Choosing the material taught and teaching method	Not specifically mentioned
2	Prepare lesson plans	Planning teaching materials and methods	Prepare teaching materials for students	Not specifically mentioned
3	Planning and designing teaching materials	Choose materials that suit their development and plan fun learning	Optional materials for the exam	Learning media are prepared for use in the teaching and learning process

The results of the analysis from Table 3 show that teachers' creativity in planning and preparing teaching materials in grades 1, 2, and 3 has a variety of approaches. In grade 1, teachers use PowerPoint presentations created with the Canva app to grab students' attention and prepare a structured Learning Implementation Plan (RPP) by selecting appropriate teaching materials and methods. Although no specific media is mentioned, the use of Canva PPT can be considered an effective medium. In grade 2, teachers focus more on preparing lesson plans and teaching materials by preparing materials according to the needs of students without mentioning the use of certain media. In grade 3, teachers plan materials appropriate to students' development, choose fun materials, and prepare relevant learning media, even though the specific media type is not explained. Overall, despite the differences in approaches, each teacher makes an effort to create engaging and engaging learning tailored to students' needs through careful planning.

Teachers' Creativity in Managing Classes

The creativity of teachers in managing grade 1 in mathematics learning, based on the observation results, can be seen that the classroom conditions are quite conducive. Teachers are skilled in explaining teaching materials in detail and systematically, inviting discussions and helping students to be able to solve problems given by teachers and express their opinions. At first, students find it difficult because they are not used to it, but the teacher uses a method by appointing students to explain a material so that inevitably students will be involved. As an effort to increase students' motivation to learn, teachers give appreciation, do *ice breaking*, and apply interesting media. In accordance with the results of the interview, to increase student motivation and learning, teachers apply interesting media according to the material, for example, geogebra for geometry material. Teachers also give appreciation to students who are active and do *ice breaking* to restore focus.

Based on the results of observations of mathematics learning in grade 2, it is known that classroom conditions are still not conducive, students still like to talk to themselves. However, teachers try to create a conducive classroom. The teacher distracts students by giving practice questions. Teachers also often give questions in the form of number operations and students compete to answer them. This makes the classroom conditions conducive again. In addition, students are given reinforcement and motivation through *ice breaking* so that students do not feel that learning mathematics is not boring. In accordance with the results of the interview, the teacher provided exercises according to the students' abilities, invited students to *ice break*, motivated and reinforced that learning mathematics was fun and not difficult.

Based on the results of observations in grade 3 mathematics learning, classroom management is very structured. The time management carried out by the teacher has been very good. The interaction between teachers and students occurs in a conducive scope. Students pay attention to the teacher's explanation first, answer the questions given or ask things that are not yet known, then the teacher gives the opportunity for students to take notes. The teacher's ability to explain and master the material by the teacher is very good so that it is easy for students to understand. This can be seen from the fact that when working on practice questions, many students participate in working on and answering oral questions given by the teacher. Students understand the concepts of the material being taught. Furthermore, before starting learning, the teacher first explains the purpose and feels it. When students feel bored, the teacher tries to attract students' attention by doing *ice breaking*. In accordance with the interview that to increase interest in learning, teachers do *ice breaking* by telling funny stories, inserting motivational sentences and applying interesting media.

To practice students' skills, teachers also give questions and students work according to the time given. Next, students who have different answers are asked to write them down in the preparation, the teacher and students discuss the problem. Appreciation in the form of praise is given by teachers not only to students who have succeeded in working on problems,

but also to students who have not been right in working on problems so that students do not feel inferior and continue to try. By the interview results, all students were appreciated for those who answered correctly and those who did not.

Teachers' Creativity Using Various Methods

The creativity of grade 1 teachers in learning mathematics applies mathematics learning strategies that are tailored to the needs of students. Teachers apply assignment methods, questions and answers, and discussions according to the material to be taught. According to the results of the interview, students' skills were honed through practicing questions according to students' abilities, conducting questions and answers, and discussions. Grade 2 teachers prefer to use an inductive approach by giving some examples of problems done with students and then drawing conclusions from the questions. According to the results of the interview, teachers prefer to practice counting by doing exercises on the board with students, so that students become more active in the learning process. Grade 3 teachers apply guided discovery strategies and discussions in small groups, leading students to draw conclusions from the material, discovering them on their own. In addition, it also applies a group discussion method so that students are more active in learning. According to the results of the interview, teachers prefer a guided discovery learning model to train students to think critically, creatively, work together and get students used to being able to communicate their ideas.

From the results of interviews with teachers, it is known that SD Inpres 12 Prafi students have good motivation and learning outcomes. Based on the results of the distribution of questionnaires carried out in each class. Each student in each class has different learning motivation questionnaire results. The results of each student are categorized into 3 categories, namely high (T), medium (S), and low (R) categories. The results of the learning motivation questionnaire can be seen in the following table:

Table 1. Student Motivation Questionnaire Results Category

It	Class	Number of Students Group		
		Tall	Keep	Low
1	Class 1	18 (72%)	7 (28%)	-
2	Class 2	8 (32%)	11 (44%)	6 (24%)
3	Grade 3	21 (84%)	4 (16%)	-

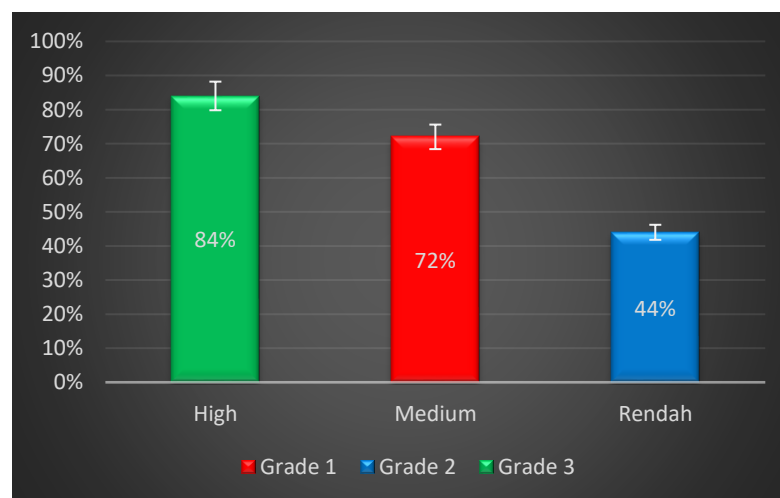


Figure 1 Description of Student Motivation Questionnaire Results

Variations in student motivation in each class can be interpreted based on classroom management and teacher creativity. In grades 1 and 3, where student motivation is higher, teachers use media such as PowerPoint and interactive learning apps to apply more interactive and varied learning methods. Meanwhile, grade 2 has more students in the moderate motivation category, which can be affected by less conducive classroom conditions, such as identified in observation, where students are often engaged in personal conversations. This indicates the need for improvement in classroom management in grade 2 in order to increase student motivation.

Furthermore, to measure students' mathematics learning outcomes, midterm exam scores (UTS) are used as a benchmark for student learning outcomes. The students' scores were grouped into 2 groups, namely the complete group and the incomplete group based on the school's Minimum Negligence Criteria (KKM) score, which was 7.5. The following are the results of the Mid-Semester Exam (UTS) mathematics scores for grade 1, 2, and 3 students obtained from subject teachers.

Table 2 Categories of Student Learning Outcomes

No.	Class	Number of Category Students	
		Finish	Complete
1	Class 1	17(68%)	8 (32%)
2	Class 2	16 (64%)	9 (36%)
3	Grade 3	21 (84%)	4 (16%)

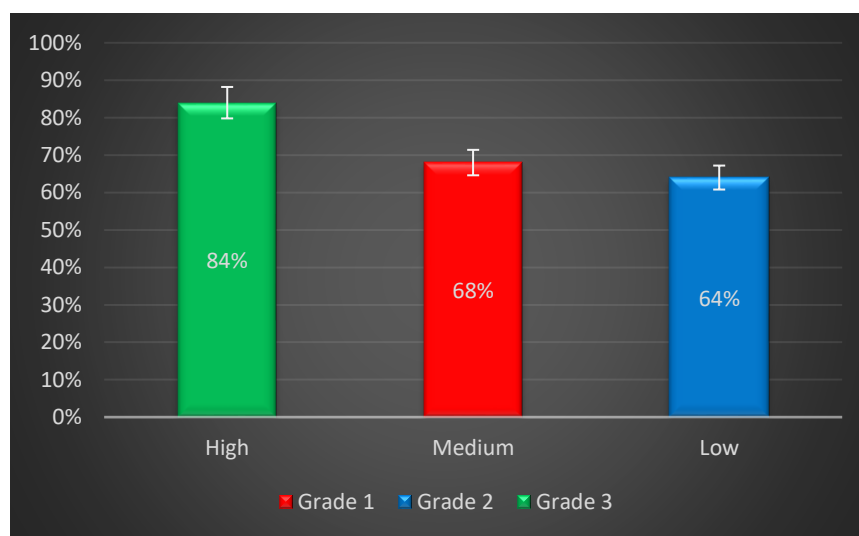


Figure 2 Categories of Student Learning Outcomes

Based on the table, it can be seen that the achievement of student learning outcomes has been very good. Most students in grades 1 and 3 achieved KKM, which reflects the effectiveness of teaching conducted by teachers, although there is slight variation between classes. In grade 2, although most students managed to achieve KKM, there were more students who did not reach KKM when compared to grades 1 and 3. This may be due to variations in student motivation, classroom management, or learning methods used by teachers, which can be improved to improve student learning outcomes in that class. This achievement indicates that teachers' efforts in designing interesting and relevant learning, as well as the ability to manage classrooms, have contributed greatly to good student learning outcomes. In this case, teachers who are creative in using innovative learning media and applying various methods can have a positive impact on students' understanding and achievement in learning mathematics.

These findings show that teachers' creativity in planning and implementing learning contributes positively to student motivation. The use of engaging media such as PowerPoint or interactive learning apps increases student engagement, in line with findings Rezkia & Rivilla (2024) which shows that the use of technology, including PowerPoint and mobile apps, increases student motivation. Research Murni et al. (2023) It also highlights that learning media innovations can increase students' interest in mathematics. Factors such as careful planning, the use of appropriate media, and varied teaching methods help create a conducive learning atmosphere, increase student motivation, and learning outcomes.

Factors that lead to good learning outcomes include careful planning, proper use of media, and varied teaching methods. Teachers who are creative in designing teaching materials and managing classes are able to create a conducive learning atmosphere, so that students feel comfortable and motivated to learn. However, there are also challenges, such as some students who still find it difficult to understand the material, especially in grade 5 where the classroom conditions are not fully conducive. In accordance with findings Murdiana et al. (2020) which underscores the importance of teachers' role in developing students' critical and creative thinking skills through a constructivism approach.

Overall, this study makes an important contribution by emphasizing teacher creativity as a key element in improving student motivation and learning outcomes. The main contribution of this research lies in strengthening the importance of teachers' creativity in managing classrooms and designing interesting learning, which has a direct impact on student motivation and learning outcomes. In line with the findings Rezkia & Rivilla (2024), This study shows that creativity in using learning media and the application of various teaching methods has an important role in improving student learning achievement. This study also supports the conclusions of Murni et al. (2023) that innovation in learning media can increase students' interest in mathematics subjects.

Based on the existing findings, it can be concluded that teachers' creativity plays a very important role in creating learning that is effective, engaging, and relevant to students' needs. Teachers' creativity in designing teaching materials, managing classes, and using varied learning methods can increase student motivation and help overcome challenges such as low student interest in mathematics subjects. The use of engaging media, interactive technology, and learning approaches tailored to students' needs have proven to be effective in facilitating understanding of mathematical concepts. In addition, teachers' creativity not only contributes to increasing learning motivation, but also to achieving better learning outcomes, as seen in excellent student learning outcomes in classrooms that have a creative approach. However, challenges in mathematics learning remain, especially related to classroom management that is not always conducive and differences in students' abilities. Therefore, teachers need to continue to innovate and collaborate to improve the quality of learning and adjust methods to technological developments and student needs. Further research needs to be conducted to explore teachers' creativity in various educational contexts and identify other factors that can influence student learning outcomes.

Conclusion

Research conducted at SD Inpres 12 Prafi shows that teachers' creativity can have a significant positive impact on student motivation and learning outcomes, especially in mathematics learning. This creativity is reflected in the planning and preparation of teaching materials, classroom management, and the use of methods that vary and suit the needs of students. Most students are highly motivated to learn and complete the learning outcomes according to the Completeness Criteria. The implications of this study show that teachers' creativity in designing mathematics learning contributes positively to student motivation and learning outcomes. The creativity applied in planning teaching materials, classroom management, and using varied methods helps create an interesting and conducive learning atmosphere. Therefore, teachers must continue innovating in developing teaching methods

and utilizing effective learning media to increase student engagement. The study had limitations on the limited number of samples in one school, which may not fully represent conditions in other schools. Therefore, for future research, it is recommended that more schools or classes be involved to expand the generalization of the findings. In addition, this study does not discuss external factors, such as students' socioeconomic background, that can affect their motivation and learning outcomes in depth. Given this, further research needs to consider these factors. In addition, schools should provide ongoing training for teachers to develop skills in designing creative and engaging learning and encourage collaboration between teachers to share experiences and effective strategies.

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