Students' Motivation through Problem-based Learning with a Culturally Responsive Teaching (CRT) Approach in Mathematics Lessons

Elly Sukmanasa[a]*, Lina Novita[a], Eka Suhardi[a], Aries Maesya[a], Awitia[b], Faridatul 'ala[b]

[a] Faculty of Teacher Training and Education, Universitas Pakuan, Bogor, Indonesia
[b] Faculty of Education, Universitas Bhayangkara Jakarta Raya, Jakarta, Indonesia
ellysukmanasa@unpak.ac.id*; linovtaz@gmail.com; ekasuhardi@unpak.ac.id; a.maesya@unpak.ac.id;
awiria@dsn.ubharajaya.ac.id; faridatul.ala@dsn.ubharajaya.ac.id
*Corresponding author

Article Info

ABSTRACT

Motivation is a person's inner desire to achieve a goal. Motivation can come from within oneself or from external or environmental factors. The two types of learning motivation are extrinsic (external) and intrinsic (deep). Rewards and praise for good work are examples of extrinsic motivation. These two types of motivation work together and strongly support learning success during the learning process, teachers must pay attention to student motivation. The purpose of this study was to analyze the motivation of fourth grade students to learn mathematics with problem-based learning methods. This research was conducted by classroom action research study. Fourth grade students become subjects of this research. Data were collected through observation, interviews, and learning motivation questionnaires. The results showed that the average motivation score of students increased from cycle 1 to cycle 2. In Cycle I, the count was 66.37, but in Cycle II the count increased to 90.96. These results suggest that problem-based learning, combined with an instructive cultural approach (CRT) to the environment can significantly increase students' desire to learn as an alternative to improving student learning outcomes.

Introduction

Motivation is a person's state of mind that encourages or focuses on goal orientation Schunk & DiBenedetto (2021) In other words, motivation is a person's internal desire to achieve a goal. Motivation can come from within oneself or from external or environmental factors. The two types of learning motivation are extrinsic (outside) and intrinsic (inside). Rewards and praise for good work are examples of extrinsic motivation. These two types of motivation work together and strongly support learning success during the learning process, the teacher must pay attention to the motivation of students. If students have a strong desire to learn, they will be encouraged to learn Suprihatin (2019) Motivated learners will use stronger cognitive processes when learning and understanding information, allowing them to absorb and store knowledge in long-term memory (Ciarán *et al*., 2014; Driscoll, 2014)

Many experts state that learning motivation affects the motivation to learn students. The results of research conducted by Saputra (2020) show that learning motivation has a positive and significant effect on student achievement. Sholihah & Kurniawan (2016) also states that motivation affects learning outcomes. A similar study was also conducted by Astuti & Handayani (2017) who found that motivation affects learning outcomes. Raheeq, *et.al.* (2023) found that learning motivation will have an impact on better student learning outcomes. Increased motivation can result in more effective learning. The authors conclude from previous research that learning motivation is indeed very influential on the learning process, so learners must find their motivation

The importance of learning motivation, many students do not have it, especially to learn Mathematics. Therefore, there is a need for an innovative approach to increase students' desire to learn so that they can understand and solve problems. Mathematics learning must be linked to real-world circumstances so that students can develop rational, critical, logical, analytical, and systematic thinking skills needed in facing an increasingly complex world (Sukmanasa *et al.*, 2021)

However, the process of learning mathematics is still difficult. As shown by the lack of drive to learn mathematics and the belief that mathematics is difficult, some students face difficulties in understanding mathematical material (Siregar, 2017). For example, line charts are often considered complicated for learners to understand. Because line charts are an important part of mathematics and have various applications in many areas of life, learning line charts in learners must be more contextual and motivating for learners. The problem-based learning approach (PBM) can help learners understand math concepts and skills by providing them with real-world problems (Saputra, 2020). The results show an improvement in discipline, cooperation, faith, and discipleship (Sukmanasa *et al.*, 2019) In the learning process, it is also important to consider the cultural diversity of learners. The Culturally Responsive Teaching (CRT) approach recognizes and values different cultures and experiences of learners during learning. This approach can increase learners' sense of appreciation for learning and increase their motivation to learn (Buchori & Harun, 2020). The application of the CRT approach can be combined with the Problem-Based Learning model. Thus, it can be concluded that the application of problem-based learning models can improve learning outcomes (Tri *et al.*, 2023)

The concept of Culturally Responsive Teaching (CRT) can be applied in learning to help students feel more involved in their learning and at the same time help students to understand the relationship between mathematical concepts and their own culture. As a new paradigm in learning focused on instruction committed to student empowerment, it is designed to enable students to move from passive recipients to acquiring meaningful knowledge that allows them to see themselves as nuanced agents of social justice and cultural values (Brown *et al.*, 2019). The Culturally Responsive Teaching (CRT) approach is teaching that recognizes and accommodates cultural diversity in the classroom so that it is integrated into the school curriculum and creates meaningful connections with cultures in the community. Culturally Responsive Teaching (CRT) is an educational approach that values cultural diversity in the classroom to support meaningful learning. In CRT approach can help students understand how thematic concepts can be applied to traditional art or architecture of their own culture. Therefore, teachers need to understand the cultural background of students and accommodate this diversity in every aspect of learning, including in mathematics learning. The novelty of this research is that Culturally Responsive Teaching is a newly developed approach in an independent curriculum, where learning integrates the culture of local wisdom in the surrounding community with the content of

material in schools. With this approach, students are expected to improve the values contained in the local culture in Indonesia which is multiculturally related to mathematics subjects in elementary schools.

The purpose of this study is to see how the use of problem-based learning approaches combined with environment-dependent learning approaches has an impact on grade VI students of SDN Julang Tanah sareal. This is done considering how important it is to overcome obstacles and increase the desire to learn mathematics on the subject of line charts. To understand the results of this method, this study will discuss relevant research questions as well as the goals to be achieved. In addition, this research has significant benefits for more contextual and meaningful mathematics learning. In addition, this research also contributes to the progress of the school curriculum and the quality of its learning.

Method

This research uses the method of class action research (PTK) where this type of research aims to improve learning practices through the process of planning, action, observation, and reflection.

Research Procedure

This research will follow the stages of the Kurt Lewin Model which consists of planning, action, observation, and reflection. The stages are explained as follows:
1. Planning: This stage includes material selection, development of research instruments, and data collection techniques.
2. Action: This stage involves the implementation of problem-based learning with a CRT approach in grade VI learners.
3. Observation: This stage involves observing the activities of learners during learning and analyzing the success of the application of learning.
4. Reflection: This stage involves reflection on the results of observation and evaluation of the successful application of learning.
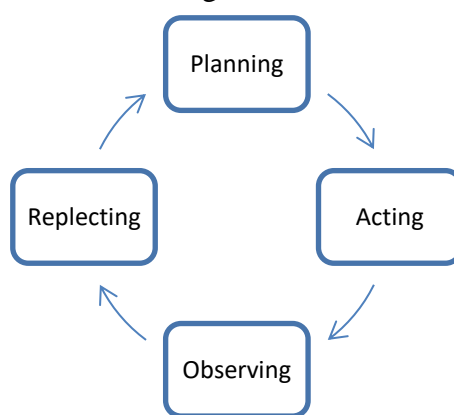

Figure 1. PTK Cycle According to Kurt Lewin

Research Procedure

The data collection methods used include:
1. Observation: Researchers will directly observe the activities of students during problem-based learning with the CRT approach.
2. Questionnaire: Learning motivation questionnaires will be given to students before and after the application of learning to measure changes in motivation.

3. Interview: Interviews will be conducted with grade VI mathematics teachers to understand their perceptions of the application of learning

Data Analysis

Techniques: Quantitative and qualitative descriptive analysis is used to analyze learning motivation questionnaire data with statistical calculations. Qualitative analysis analyzes observational data to find patterns or trends and make conclusions according to the research objectives.

Results and Discussion

The results of the research conducted using classroom action research are as follows:

Activities in Each Learning
1. Learning Cycle 1
   In the first cycle, learning was carried out with line chart material. Teachers start learning by praying and checking the attendance and readiness of students. After that, the objectives and benefits of learning are conveyed to the learners. Teachers provide perceptions and introduce problems related to the material Students are divided into groups, and they are given the task of searching, studying, drawing, and interpreting line charts. Presentation of group findings is carried out, followed by feedback from other groups and teacher guidance.
2. Learning Cycle 2
   In the second cycle, learning is carried out with bar chart material. Learning begins with a group prayer and checking the attendance and readiness of students. The teacher conveys the learning objectives and provides perceptions. Students are divided into groups, and they are asked to make observations and investigations into the given problems. The findings are then presented in the form of conclusions and presentations.

Data Analysis in Each Learning Cycle
1. Learning Cycle 1:
   Learners are very interested in learning in the first cycle. They are good at working together in groups and actively seek out and study line diagram material. However, there is room for more targeted and constructive feedback and an increased variety of learning resources.
2. Learning Cycle 2
   In the second cycle, learners show increased interest and engagement in the lesson. They are also more active in observation, research, and delivery of results. In addition, the group produced more constructive feedback, which suggests that people are more motivated to learn.

Improvement Data Analysis

In analyzing data on increased learning motivation, the learning motivation scores of learners from grade VI were measured on two learning cycles. The data showed a significant increase in learners' learning motivation after the implementation of problem-based learning with a culturally responsive teaching (CRT) approach.

Table 1. Learning Motivation Score Data for Class VI Students of SDN Julang Tanah Sareal

Nama	Siklus 1	Siklus 2
APP	66,67	94,67
DAN	49,33	84,67
BRN	80,00	88,00

Nama	Siklus 1	Siklus 2
MAP	86,67	98,67
AL	41,33	93,33
ABN	65,33	81,33
CFWW	64,00	90,64
DORM	56,00	96,67
DJN	53,33	85,33
FEJ	65,33	90,67
ASC	82,67	96,00
ANM	78,67	100,00
ABF	74,67	94,67
DCE	80,00	97,33
FIJI	46,67	84,00
FSAW	52,00	84,00
LBR	68,00	84,00
LCP	70,67	93,33
FAD	36,00	86,67
NAIS	66,67	96,00
NBS	54,67	84,00
NAADF	72,00	89,33
DAM	65,33	98,67
NRA	88,00	93,33
LBR	65,33	90,67

From these data, it can be seen that from cycle 1 to cycle 2, the average learning motivation score of students increases. In the first cycle, the score was 66.37, but in the second cycle, the score increased to 90.96. These results suggest that problem-based learning combined with a Culturally Responsive Teaching (CRT) approach to the environment can significantly increase students' desire to learn.

Table 2. Data from Student Activity Observation Class VI SDN Julang Tanah Sareal

Activity	Cycle 1	Cycle 2
Listen to the teacher's explanation	89%	93%
Ask	81%	84%
Read reading materials	53%	55%
Write notes	33%	34%
Discuss with friends	77%	87%
Working on LKPD	96%	98%
Seeking Information from Other Sources	57%	65%

From the observation data of student activity, all activities in cycle 2 compared to cycle 1 increased, except for note-taking activities, which increased slightly. Discussions with friends increased by 10%, indicating better cooperation and interaction between students.

The Effect of Applying a Culturally Responsive Teaching Approach in Problem-Based Learning. The results showed that students' motivation to learn about Line Chart and Bar Chart material increased when problem-based learning methods were combined with Culturally Responsive (CRT) learning approaches. Learners have shown increased interest and engagement in learning activities during the First Learning Cycle, where the material taught is a boxplot. They make observations, make conclusions, and actively study the material. This shows that the CRT method can encourage students' interest and desire to learn. However, there is still room for improvement in Learning Cycle 1. A variety of learning resources and more focused feedback can increase students' desire to learn. The CRT method emphasizes the use of student experience as a learning resource, but variations in the method can also increase the diversity aspect of learning.

Learning Cycle 2 showed greater improvement, with material focused on bar charts. Learners show more passion and engagement. They are more involved in observation,

research, and development and delivery of results. In addition, groups of learners showed improvement in cooperation and interaction by providing more frequent feedback and constructive responses. Increased motivation and interaction through a culturally responsive teaching approach.

The results of the data analysis showed that student learning motivation increased significantly from Learning Cycle 1 to Learning Cycle 2, with the average score of student learning motivation increasing from 66.37 in Cycle 1 to 90.96 in Cycle 2. This shows that problem-based learning methods combined with CRT methods are very effective in increasing students' desire to learn. Not only does learning motivation increase, but interaction between students also increases. From Cycle 1 to Cycle 2, discussing with friends increased by 10%. CRT approaches that value cultural diversity and learner experiences seem to create a more inclusive learning environment and support collaboration among learners. Better learning experiences and better understanding can be achieved through these better interactions.

Culturally Responsive Teaching teachers who utilize CRT practices value students' cultural and linguistic resources and view this knowledge as capital to build upon rather than as a barrier to learning. These teachers use this capital (i.e., personal experiences and interests) as the basis for instructional connections to facilitate student learning and development (Aceves & Orosco, 2014). Several frameworks exist for culturally responsive approaches (e.g., culturally responsive education, culturally relevant teaching, and culturally congruent teaching), each outlining various components (Muñiz, 2019). Culturally responsive pedagogy is an approach to teaching and learning that "uses the cultural characteristics, experiences, and perspectives of ethnically diverse students as channels to teach them more effectively"(Morrison *et al.*, 2019).

Research results (Cruz *et al.*, 2020) Teachers reported feeling more confident in building personal relationships and increased self-efficacy. With students through culturally specific knowledge, such as validating students in their mother tongue and teaching students about their cultural contributions. This is shown through years of experience in positively related relationships between teachers and students.

Abacioglu *et al.* (2020) Our results showed that positive attitudes and awareness about diversity and perspective-taking skills were associated with increased cultural and social sensitivity in teaching. Thus, strengthening these skills can improve the educational position of students with a history of migration, as well as benefit their peers without any history of migration.

The application of culturally responsive teaching seems promising for all students and the professional development of educators in multicultural settings. Culturally Responsive Teaching helps teachers identify and maximize the cultural resources that students bring into the classroom leading to the creation of a more competent and equitable society (Portes *et al.*, 2018).

Conclusion

Based on the research and discussion of previous chapters, several conclusions can be made: Problem-based learning can be applied through context-responsive learning approaches. Contribute positively to students' learning motivation in the material Line diagram and bar chart of SDN Julang Tanah Sareal. The response of learners to problem-based learning about class VI diagram material was very positive. It can be seen that learners are very involved in learning activities. They engage in observation and investigation,

develop results, present conclusions and presentation of results, and provide constructive feedback and responses.

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