

Improving Motivation and Self-Efficacy in Mathematics through Project-Based Learning for Fourth Graders

Isti Rahmawati^{1*}, Wachid Pratomo², Happy Nanda Mustika³, and Ina Nur Arina⁴

¹⁻² Universitas Sarjanawiyata Tamansiswa, Indonesia

³⁻⁴ Elementary School A Yogyakarta, Indonesia

*Corresponding Author e-mail: rahmawatiisti16@gmail.com

1. Abstract

This study aims to describe the increase in learning motivation and self-efficacy of students in learning mathematics through the application of the Project Based Learning (PjBL) model in class IV Elementary School A in Yogyakarta, Indonesia. The method used in this research is the Classroom Action Research method. The research was carried out as an effort to overcome the problems that arise in the classroom. This method is conducted in 3 (three) stages, namely planning, implementation and observation, and reflection. The stage is a cycle that takes place repeatedly. The action focused on increasing students' learning motivation and self-efficacy in learning mathematics as the goal of the research conducted. This research was conducted from April 2023 to May 2023 with the research subjects as many as 12 students in class IV Elementary School A Yogyakarta. The research was conducted through pre-cycle and 2 (two) cycles with each cycle consisting of 1 (one) meeting. The research instruments used include observation sheets of PjBL implementation as well as questionnaires of learning motivation and self-efficacy of students. The results showed that the number of students in the high motivation category in the pre-cycle was 0%; cycle I was 41.67%; and cycle II was 75% so that an increase of 41.67% and 33.33% was obtained. The number of students with high self-efficacy in the pre-cycle was 16.67%; cycle I was 33.33%; and cycle II was 75% so that there was an increase of 16.66% and 41.67%.

Keywords: Learning Motivation, Self-Efficacy, Project-Based Learning

2. Introduction

Learning is influenced by several factors. According to Muhibbinsyah (Sugihartono, et al., 2013: 77), there are 3 factors that influence learning, namely internal factors, external factors, and learning approach factors. Two of the internal factors are motivation and self-efficacy. According to Sardiman (2012: 75) motivation is the overall driving force within students that ensures the continuity of learning activities and provides direction so that the desired goals can be achieved. It is this motivation that will foster passion, pleasure, and enthusiasm for student learning. Another factor that supports learning success is confidence in one's abilities. It is important for learners to have confidence in their ability to perform a certain set of actions so that they are able to go through and execute the changes (Bingol, 2018). This belief is called self-efficacy. According to Baron & Byrne (Ghufron & Rini, 2010: 73) defines self-efficacy as an evaluation process carried out by individuals in assessing their abilities when performing various tasks and when facing various difficulties. This means that self-efficacy is an assessment of self-ability. Meanwhile, according to Bandura (Feist and Feist, 2010: 2012) self-efficacy is an individual's belief in the ability to exercise a form of self-control related to individual functions and this occurs in the environment. Observations of mathematics learning and interviews with a fourth-grade teacher at Elementary School A in Yogyakarta, Indonesia show that the learning conditions are unsatisfactory. Only a few learners (less than 7 out of 12 learners) could respond to learning questions given by the teacher. Learners also seem to complain and ask for leniency when getting assignments from the teacher. When doing assignments, learners need more intense guidance in order to complete the

assignments on time. Most learners ask the teacher too often because they feel unsure of their work. During discussions, learners seemed hesitant in giving answers so they waited to be appointed by the teacher. This shows that the level of motivation and self-efficacy of fourth grade learners is still low.

Tabany (2014: 51) says the learning model is a plan that follows the pattern of learning in the classroom so that it is used as a guide in learning. There are several learning models, one of which is Project-Based Learning (PjBL). Thomas (2000:1) describes PjBL as a learning model that uses projects as its goal. Project-based learning is authentic learning that involves the active role of students (Jia-wei et al., 2014: 252). PjBL is a teaching and learning activity that involves learners in solving problems, collecting answers, integrating answers, and producing a project (Gregory & Chapman, 2013: 163). Various problems or questions are designed by the teacher so that learners investigate and understand them (Majid & Rochman, 2014: 162). The results of Akbar's research (2017: 104) show that the application of the PjBL learning model can increase students' learning motivation. The results showed that the learning motivation of students with PjBL was higher than the learning motivation of students with other learning models. Research conducted by Salma (2022: 95) shows that learning motivation can increase by applying PjBL.

Based on the description of these problems, the researcher assumes that the problem of learning motivation and self-efficacy of students needs to be improved. Research that has been done focuses on increasing learning motivation by implementing PjBL. Researchers are interested in increasing the learning motivation and

self-efficacy of grade IV SD A students by applying a project-based learning model.
Methods.

2.1. Participants and context

The subjects in this study were 12 fourth grade students at SD A Yogyakarta in Semester II of the 2022/2023 academic year. The research was conducted from April to May 2023. The research design used was Classroom Action Research (PTK) proposed by Kemmis and Mc Taggart (Kusumah, W. & Dwitagama, D., 2010: 20) as follows.

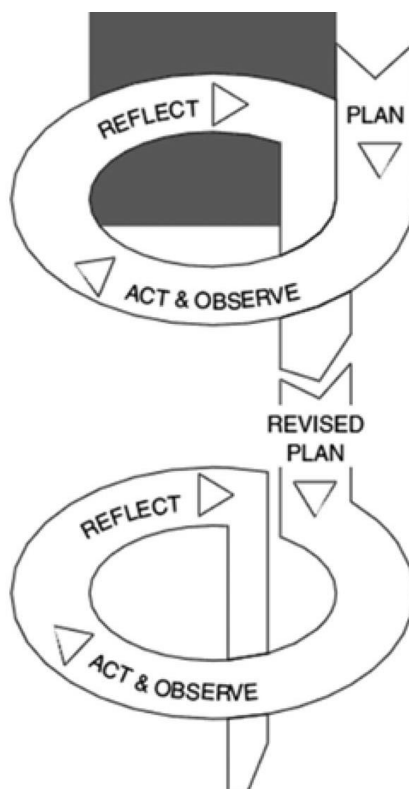


Figure 1. Kemmis and Mc Taggart Model

This research design has 3 stages, namely planning, implementation and observation, and reflection. These stages are a continuous repetitive cycle, so that if the action objectives have not been achieved then it can be continued to carry out the next cycle. This research was conducted to observe the increase in learning motivation and self-efficacy of students when participating in learning activities in mathematics subjects.

2.2. Material

The data collection instruments in this study were observation sheets of learning implementation activities and questionnaire sheets of learning motivation and self-efficacy of students. This questionnaire sheet contains statements that can describe the learning motivation and self-efficacy of students when participating in learning activities by implementing PjBL. The questionnaire used in this study is a closed questionnaire with alternative choices using a Likert scale match list (Sukardi, 2011: 147), namely SS = very suitable (4), S = suitable (3), TS = not suitable (2), and STS = very unsuitable (1).

2.3. Data Collection and analysis

Data collection was carried out by filling out an observation sheet which was used to see the situation and conditions of students' learning activities when participating in learning activities in the classroom. In addition, the questionnaire sheet was also given to students as respondents to then fill in the score according to their situation. Data analysis in this study used quantitative descriptive analysis and qualitative description. Quantitative descriptive analysis is used to describe the results of questionnaires of learning motivation

and self-efficacy of students which are manifested in three categories, namely low, medium and high. The category formula used according to Azwar (2012: 149) is as follows.

Table 1. Categories of Learning Motivation and Self-Efficacy

| Score Criteria | Categories |
|--|------------|
| $x < (\mu - 1,0 \sigma)$ | Low |
| $(\mu - 1,0 \sigma) \leq x < (\mu + 1,0 \sigma)$ | Medium |
| $\mu + 1,0 \sigma \leq x$ | High |

Description:

μ = theoretical mean

σ = standard deviation

Through the calculation of quantitative data, it is converted into qualitative data using verbal sentences to describe the increase in learning motivation and self-efficacy in learning.

2.4. Ethical Considerations

This classroom action research was conducted to determine the increase in learning motivation and self-efficacy of fourth grade students of SD A Yogyakarta which was observed starting from the pre-cycle. At the end of the pre-cycle and cycle I, researchers reflected on the shortcomings and strengths of the learning practices that had been carried out. The results of this reflection are then used as material for planning learning in the next cycle. If the expected results have not been achieved, then improvements need to be made until the indicators are achieved.

2.5. Limitations to the Study

This research is limited to efforts to increase students' learning motivation and self-efficacy by implementing PjBL in mathematics learning in class IV SD A Yogyakarta.

This research is said to be successful if it is able to achieve predetermined criteria. Criteria is a benchmark for determining the success of a programme or activity. The criteria for the success of class action research are changes in both the process and the results that are better after the action is taken. According to Djamarah & Zain (2010: 107) there are several levels of learning success criteria, namely: (1) excellent if all (100%) students master learning, (2) very good if 76%-99% of students master learning, (3) good if 60%-75% of students master learning, and (4) less if students who master learning are less than 60%. Based on these criteria, the success indicator in this study is an increase in learning motivation and self-efficacy of students in the learning process reaching at least 70% of the high category.

3. Results and Discussion

Classroom action research in class IV SD A Yogyakarta was carried out with pre-cycle, cycle I, and cycle II. The research was conducted by applying the PjBL model. Based on the data that has been obtained, the results of data processing can be presented as follows:

Table 2. Student Motivation Learning Data

| No | Respondent | Motivation Learning | | |
|----|------------|---------------------|---------|----------|
| | | Pra-Cycle | Cycle I | Cycle II |
| 1 | AFR | 72 | 77 | 78 |
| 2 | AAZ | 70 | 74 | 75 |
| 3 | APN | 71 | 77 | 77 |

| | | | | |
|---------------------------|-------|--------------|--------------|--------------|
| 4 | ARQ | 69 | 75 | 75 |
| 5 | AC | 63 | 69 | 75 |
| 6 | FAQ | 58 | 64 | 69 |
| 7 | HN | 55 | 62 | 69 |
| 8 | HAPS | 69 | 69 | 73 |
| 9 | LK | 72 | 76 | 75 |
| 10 | MAAAW | 63 | 70 | 73 |
| 11 | PDSP | 71 | 71 | 74 |
| 12 | SPH | 63 | 67 | 70 |
| Mean | | 66.33 | 70.92 | 73.58 |
| Standard Deviation | | 5.77 | 5.02 | 2.94 |
| Range | | 17.00 | 15.00 | 9.00 |
| Minimum | | 55.00 | 62.00 | 69.00 |
| Maximum | | 72.00 | 77.00 | 78.00 |

The collected learning motivation data was then analysed to obtain the following results.

Table 3. Results of Learning Motivation Data Processing

| Categories | Pracycle | | Cycle I | | Cycle II | |
|------------|------------|------------|------------|------------|------------|------------|
| | Respondent | Percentage | Respondent | Percentage | Respondent | Percentage |
| Low | 2 | 16.67% | 0 | 0% | 0 | 0% |
| Medium | 10 | 83.33% | 7 | 58.33% | 3 | 25% |
| High | 0 | 0% | 5 | 41.67% | 9 | 75% |

The table of results of questionnaire data processing of student learning motivation above shows that the percentage of students with high motivation in the pre-class 0% cycle I 41.67% and cycle II 75%. So that there was an increase in cycle I of 41.67% and in cycle II of 33.33%. The data is presented in a bar chart as follows.

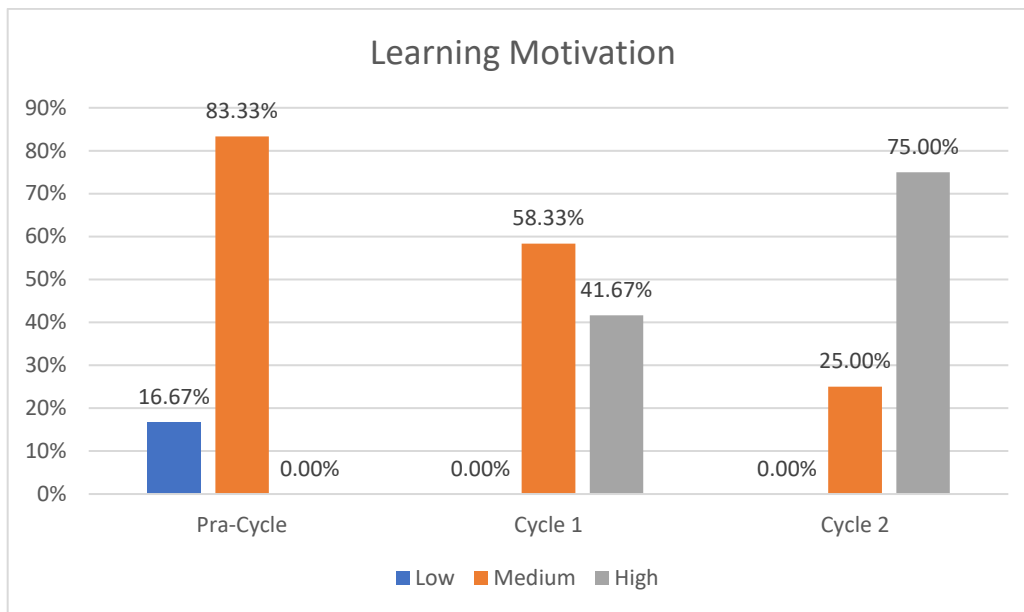


Figure 2: Diagram of Percentage Increase in Learning Motivation

Self-efficacy data processing is also carried out in the same way. The following is the self-efficacy data that has been collected.

Table 4. Learner Self-Efficacy Data

| No | Respondent | Self-Efficacy | | |
|----|------------|---------------|---------|---------|
| | | Pra-Cycle | Cycle 1 | Cycle 2 |
| 1 | AFR | 75 | 76 | 78 |
| 2 | AAZ | 67 | 69 | 73 |
| 3 | APN | 68 | 71 | 76 |
| 4 | ARQ | 68 | 70 | 71 |
| 5 | AC | 69 | 69 | 71 |
| 6 | FAQ | 65 | 67 | 69 |

| | | | | |
|------------------|-------|--------------|--------------|--------------|
| 7 | HN | 65 | 67 | 69 |
| 8 | HAPS | 67 | 67 | 72 |
| 9 | LK | 71 | 73 | 74 |
| 10 | MAAAW | 70 | 72 | 75 |
| 11 | PDSP | 67 | 69 | 72 |
| 12 | SPH | 66 | 66 | 69 |
| Mean | | 68.17 | 69.67 | 72.42 |
| Standard | | | | |
| Deviation | | 2.82 | 2.93 | 2.91 |
| Range | | 10.00 | 10.00 | 9.00 |
| Minimum | | 65.00 | 66.00 | 69.00 |
| Maximum | | 75.00 | 76.00 | 78.00 |

The data above is then processed so that the following results are obtained.

Table 5. Results of Self-Efficacy Data Processing

| Category | Pra-Cycle | | Cycle 1 | | Cycle 2 | |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|
| | Responden t | Percentag e | Responden t | Percentag e | Responden t | Percentag e |
| Low | 2 | 16.67% | 0 | 0% | 0 | 0% |
| Medium | 8 | 66.67% | 8 | 66.67% | 3 | 25.00% |
| High | 2 | 16.67% | 4 | 33.33% | 9 | 75.00% |

The table of self-efficacy data processing results above shows that students with high self-efficacy in the pre-cycle were 16.67%, in cycle I 33.33% and in cycle II 75%. From this data, there was an increase in the percentage of students with high self-efficacy in

cycle I 16.66% and in cycle II 41.67%. The increase data can be displayed in a bar chart as follows.

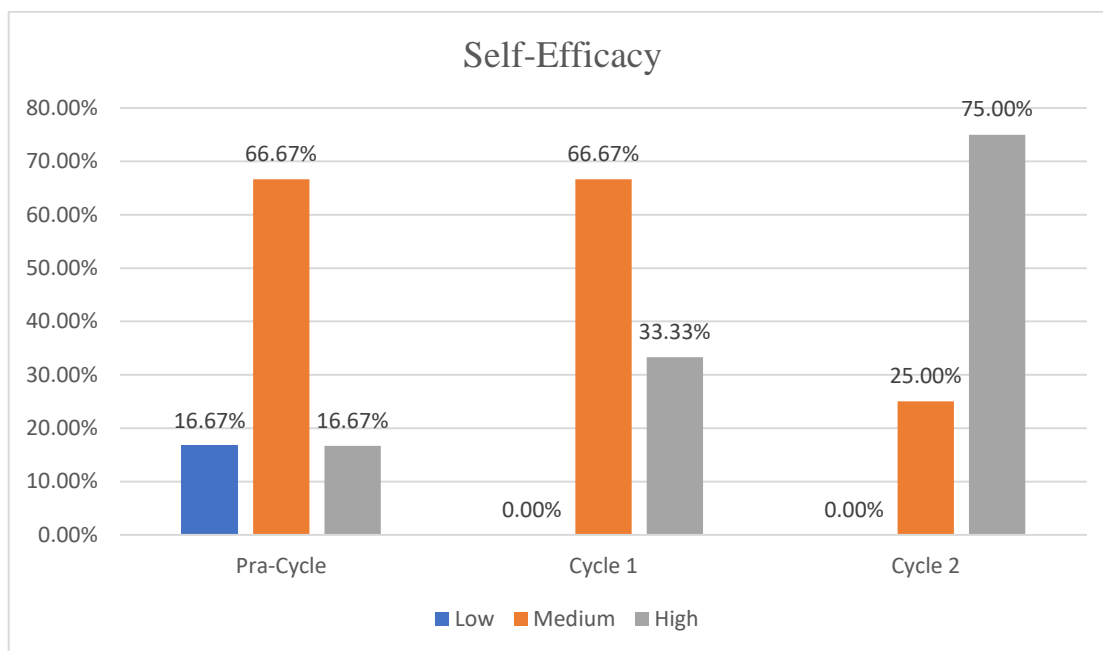


Figure 3. Diagram of Percentage Increase in Self-Efficacy

4. Conclusion

Based on the results of research and discussion, it can be concluded that the learning motivation and self-efficacy of fourth grade students of SD A Yogyakarta in learning mathematics has increased by applying the PjBL model. This can be shown by an increase in the percentage of students with high learning motivation in the pre-cycle 0% cycle I 41.67% and cycle II 75%. So that there was an increase in cycle I of 41.67% and in cycle II of 33.33%. An increase also occurred in the percentage of students with high self-

efficacy, namely the pre-cycle of 16.67%, in cycle I 33.33% and in cycle II 75%. From this data, there was an increase in the percentage of students with high self-efficacy in cycle I 16.66% and in cycle II 41.67%. This percentage has reached the predetermined success indicator, so the research was stopped in cycle II.

5. References

- Akbar, F., Bahri, A. (2017). Potensi Model PjBL (Project-Based Learning) dalam Meningkatkan Motivasi Belajar Peserta Didik dengan Gaya Belajar Berbeda. *Jurnal Sainsmat*. Volume VI (1:95-106). ISSN 2579-5686. <http://eprints.unm.ac.id/>
- Bingol, T. (2018). Determining the Predictors of Self-Efficacy and Cyber Bullying. *International journal of High Education*, 7(2), 138-143. Retrieved from <https://doi.org/10.5430/ijhe.v7n2p138>
- Djamarah, S. B., Zain, A. (2010). *Strategi Belajar Mengajar*. Jakarta: Rineka Cipta.
- Feist, J. & Feist, G.J. (2010). *Teori Kepribadian (Edisi ketujuh)*. Jakarta: Penerbit Salemba Humanika
- Ghufron, M. Nur., & Rini Risnawati S. (2010). *Teori-Teori Psikologi*. Yogyakarta: Ar-ruzz Media Group.
- Gregory, G. H., & Chapman, C. (2013). *Differentiated Instructional Strategies* (Third). United States of America: Sage Company.
- Jia-wei, Z., Lam, W., Tak-hang, C., & Chi-shing, C. (2014). Curriculum adaptation in special schools for students with intellectual disabilities (SID): a case study of project learning in one SID school in Hong Kong. *Frontiers of Education in China*, 9(2), 250–273. <https://doi.org/10.3868/s110-003-014-0019-x>
- Kusumah, W., Dwitagama, D. (2010). *Penelitian Tindakan Kelas*. Jakarta: Indeks.
- Majid, A., & Rochman, C. (2014). *Pendekatan Ilmiah Dalam Implementasi Kurikulum 2013*. Bandung: Remaja Rosdakarya.
- Saifuddin Azwar. (2012). *Penyusunan Skala Psikologi*. Yogyakarta: Pustaka Pelajar.
- Salma, A. (2022). *Pengembangan Model Online Project-Based Learning: Pengaruhnya terhadap Motivasi dan Hasil Belajar Bahasa Inggris*. <https://eprints.uny.ac.id/>
- Sardiman. (2012). *Interaksi dan Motivasi Belajar Mengajar*. Jakarta: Raja Grafindo Persada.
- Sugihartono, et al. (2013). *Psikologi Pendidikan*. Yogyakarta: UNY Press.

- Sukardi. (2011). *Metodologi Penelitian Pendidikan Kompetensi dan Praktiknya*. Jakarta: PT Rineka Cipta.
- Tabany, T. I. B. Al. (2014). *Mendesain Model Pembelajaran Inovatif, Progresif dan Kontekstual*. Jakarta: Prenadamedia Group.
- Thomas, J. W. (2000). *A Review of Research on Project-Based Learning*. The Autodesk Foundation.