Journal of Primary Education
11 (1) (2022) : 66 – 71

https://journal.unnes.ac.id/sju/index.php/jpe/article/view/36048

The Implementation of Problem Solving-Based Scientific Learning to Improve Motivation and Learning Outcomes of Class IV Elementary School Students

Lena Cendrawati[1]✉, Agus Wahyudin[2] & Eko Handoyo[3]

[1] Public Elementary School Kluwut 02 Bulakamba, Brebes, Jawa Tengah, Indonesia
[2] Accounting, Universitas Negeri Semarang, Indonesia
[3] Pancasila and Civic Education, Universitas Negeri Semarang, Indonesia

Article Info

History Articles
Received:
November 2019
Accepted:
December 2019
Published:
January 2022

Keywords:
learning outcomes, learning motivation, scientific learning

DOI
https://doi.org/10.15294/jpe.v11i3.36048

Abstract

The research was conducted to apply an effective model of learning in improving motivation and learning outcomes of students by using problem solving-based scientific learning. The study is an experimental research with quasi design. The samples were taken from SD Kluwut 02 and SD Grinting 01. One class was taught using problem solving-based scientific learning model and the other class thaught using convensional model. The results of this research show that there was a significant increase in motivation and learning outcomes. It was obtained an increase the average learning motivation score by 4.86% and learning outcomes by 39.4%. Learning motivation had a positive and significant effect on learning outcomes with an influence of 24.55%. Students responded very well to learning theme 8 and sub theme 3 using problem solving- based scientific learning model. It concluded that this learning model is is very effective and recommended to be applied in elementary schools.

✉ Correspondence address:
Raya Kluwut RT.01/RW.01, Bulakamba,
Brebes, Jawa Tengah, 52253
E-mail: lena.humardani77@gmail.com

p-ISSN 2252-6404
e-ISSN 2502-4515

INTRODUCTION

Education, especially in formal institution, have important role and responsibility to prepare human resources who are able to the challenges of the changing times and progressing forward. The education must be able to equip students with at least the following five competencies: (1) intellectual competence, (2) personal competence, (3) communicative competence, (4) socio-cultural competence, and (5) vocational kinestesic competence. Intellectual competence refers to the ability to think, to do research and discover to solve problems, and to make decisions (Ramadhany, 2016).

Basically, this competence focuses on cognitive mastery and analytical skills, as well as for the intellectual and rational thinking. That is the reason that elementary school students are directed to be a reading society and a writing society which are absolute requirements for forming an intellectual society or nation. Various research show that science emphasizes scientific values to reflect the values of basic competencies by concerning the learning objectives through a process as the main content (Widyaningrum, 2017). In addition, there is a correlation between learning motivation with increased student learning outcomes that are influenced by the learning model (Ghulam, 2011).

Behaviorism learning perspective states that learning is a process of behavior change, a person's reaction to an action. In other words, that changes in behavior is a result of experience, which can determine the level of mastery or knowledge that students have obtained previously. Cognitive learning perspective looks at someone learning with the results of the acquisition of knowledge with information processing and memory that involves a person's mental processes such as thinking, remembering, problem solving, and motivation. This recommendation provides an opportunity in the form of exposure to student learning outcomes that are influenced by the motivation that can be improved by using problem solving-based scientific learning (Sulistyorini, 2017). This is what drives the need for research entitled: "The Implementation of Problem Solving-Based Scientific Learning to Improve Motivation and Learning Outcomes of Class IV Elementary School Students".

METHODS

A quantitative type with a deductive approach was used in this research. Furthermore, quasi-experimental research design was used along with its hypothesis testing. It refers to an activity of collecting, processing, analyzing, and presenting data which are carried out systematically and objectively to solve a problem in order to test a hypothesis to develop principles common with the use of calculations with Parametric Statistics. The population in this research were all grade IV elementary school students in Sekbin 1 Glatik Cluster in Bulakamba District, Brebes Regency, which oversaw 10 elementary schools. The independent variable is a variable that affects the dependent variable, in this research was the problem solving-based scientific learning. The dependent variable in research was the learning outcome, while the control variable was the learning motivation. The students were expected to have improved learning outcomes with the classically method, almost the same school facilities, at theme 8 and sub-theme 3 of grade IV Elementary School.

RESULTS AND DISCUSSION

Learning is said to be effective if after being tested, the results are: (a) student learning outcomes in the theme 8 and sub-theme 3 with a prolem solving-based scientific learning model achieve classical learning completion; (b) there are differences in student learning outcomes before the treatment and after the treatment; (c) the learning outcomes of students with problem solving-based scientific learning model are higher than those in conventional learning classes; and (d) there is improvement of student learning outcomes with problem solving-based scientific learning model which is included in the medium category (Fitri, 2018).

From the results of research, during the learning process the students were given the opportunity to construct their own sentences in solving problems of theme 8 and sub-theme 3. In addition, students experienced reading, listening, discussion, using teaching media, and working with friends in Group. Problem solving-based scientific learning gives a meaningful learning process to students, where the students use iIntellectual competence refers to the ability to think, research and discover to problem solving (Hyytinen, 2018). This resulted on student learning outcomes to improve and student test results (post test) have exceeded the research target. The number of students in the experimental class from both Kluwut 02 Elementary School and Grinting 01 Elementary School who completed the KKM has also reached classical completion.

Other research data also shows that the learning motivation questionnaire had increased scores in each indicator of learning motivation. The motivation indicators included: (1) Duration of activity, (2) Frequency of activities, (3) Presence on the objectives of the activity, (4) Resilience, tenacity and ability to deal with activities and difficulties to achieve goals, (5) Dedication and sacrifice to achieve goals, (6) Aspirations to be achieved with the activities carried out, (7) The level of achievement qualifications, (8) The direction of the students attitude towards the target activity.

To find out whether learning motivation has an effect on student learning outcomes that are subjected to problem solving-based scientific learning model, the researcher conducted a simple regression test using learning motivation questionnaire data with posttest data from the experimental classes (Class 4 B) both in Kluwut 02 Elementary School and SD Grinting 01. Based on the results of the independent sample t-test on, it was found that the student motivation during the learning process of theme 8 and subtheme 3 with a problem solving-based scientific learning model was better that of the student motivation who were subjected to conventional learning models. This was proven by Asymp value. Sig. (2-tailed) was 0,000 less than the critical limit of research 0.05, so H_1 was accepted. This means that there is a significant difference between the motivation of the control class and the motivation of the experimental class.

The following indicators were used to find out whether learning motivation affects student learning outcomes with a problem solving-based scientific learning model in learning on Theme 8 and Subtheme 3: (1) perseverence in facing tasks, (2) showing interest, (3) resilient in facing difficulties, (4) happy to work independently, (5) quickly get bored with routine tasks, (6) can maintain his opinion, (7) not easily let go of things that are believed, (8) like to find and solve problems problems. Table 1 below explains the average motivational score of each indicator as the following data were obtained.

Table 1. Average Motivation Score for Each Indicator

School	Class	Indicators							
		1	2	3	4	5	6	7	8
SD Kluwut 02	Control 1	3.49	3.11	3.21	3.00	3.21	3.54	3.48	3.41
	Experiment 1	3.69	3.39	3.53	3.35	3.43	3.56	3.55	3.69
SD Grinting 01	Control 2	3.62	3.37	3.33	3.23	3.31	3.14	3.09	3.40
	Experiment 2	3.64	3.51	3.41	3.43	3.41	3.53	3.45	3.62

In Table 1, we can see that the average motivation score for each indicator has increased by problem solving-based scientific learning models. In Table 1, the results of motivation scores for learning control class and experimental elementary school Kluwut 02. Furthermore, based on the average score, it is shown that the motivation score of the experimental class is better than those of control class with its mean score of 5.2 at SD Kluwut 02 and 4.52 at SD Grinting 01. This means there is an increase in the average motivation score from conventional learning models to problem solving-based scientific learning model by 4 86%. So, it can be concluded that there is an increase in student

motivation after problem solving-based scientific learning.

The increase in learning motivation in both the experimental class and the control class both at SD Kluwut 02 and SD Grinting 01 can seen as presented in Figure 1.

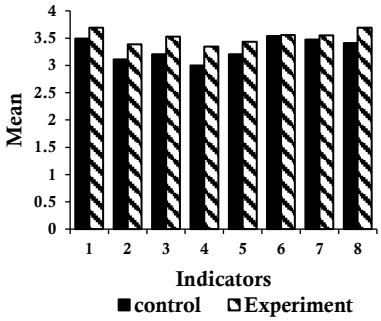

Figure 1. Learning Motivation Graph of Control Class and Experimentation Class of Kluwut Elementary School 02

In Figure 1, the highest increase occurred in indicator 4 by 12% of the control class score, indicating that students enjoyed to learn theme 8 and subtheme 3 with problem-based scientific learning models, especially when given independent work. While the results of learning motivation in the control class and experimental class in Grinting 01 Elementary School can be seen as presented in Figure 2.

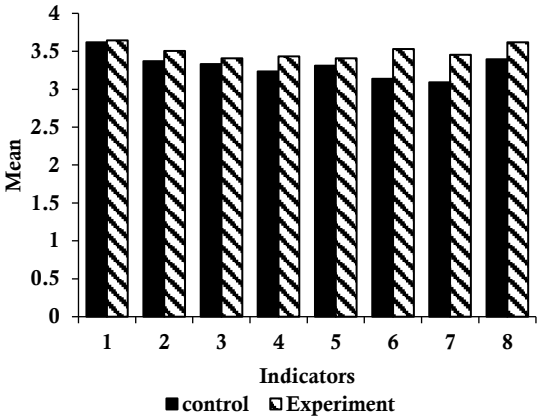

Figure 2. Learning Motivation Graph of Control Class and Experiment Class of Grinting Elementary School 01

Based on Figure 2 about the motivation graph of SD Grinting 01, the highest increase occurred in indicator 6 by 13% of the control class score. This shows that students enjoy to follow the learning theme 8 subtheme 3 with a problem solving-based scientific learning model, especially when given questions students can answer and be able to defend their opinions. This condition is illustrated in the statement data that received the highest score in indicator 6.

To find out the comparison of the average learning outcomes of the post test scores of each class, the data are presented in Table 2.

Table 2. Comparative Test of Post Test Scores of Control Class and Experiment Class

Data	t-value	Sig	Conclusion
Control 1 - Exsperiment 1	-3.755	0.001	Significant difference
Control 2 - Exsperiment 2	-2.485	0.016	Significant difference

Table 2 explains that from the average learning outcomes based on the difference test with SPSS 20 using independent sample t test with a significance level of 0.05 in Table 2, it was found that the significance value of experimental class 1 and experimental class 2 is less than 0.05, then H_0 is rejected. This shows that there is a difference in the average ability of experimental class students with the ability of control class students after being treated or it can be said that there is a significant difference in the average ability of the experimental class and the control class. To determine which average posttest score is better, a further test is conducted by looking at the mean of the two classes being compared. The average score of control class 1 is 79.57 and experimental class 1 is 83.42, so it can be concluded the final ability of experimental class 1 is better than control class 1. Whereas, the average score of control class 2 is 80 and experimental class 2 is 82.82, so it can be concluded the final ability of the experimental class 2 is better than the control class 2. To better know the comparison of the average learning outcomes both the pretest and posttest scores of each class can be presented in Figure 3 below.

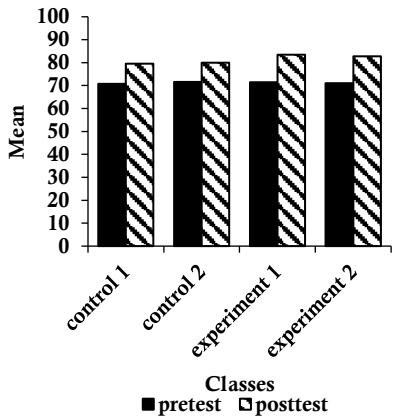

Figure 3. Average Score Histogram Graph of Learning Outcomes

Based on Figure 3, it can be seen that the average pretest results of the four classes show almost the same score, which is ranged between 70 to 72. As for the posttest score, it is more varied between the control class and the experimental class. Overall, each class got an average posttest score higher than the pretest score, but the posttest score is different for each class. The posttest score of the experimental class 1 and experimental class 2 is higher than the control class 1 or the control class 2. It can be concluded that the average learning outcomes of the experimental class with problem solving-based scientific learning are better than the control class with conventional learning.

CONCLUSION

The use of problem solving-based scientific learning model on student learning outcomes in the theme of problem 8 subtheme 3 achieves classical learning completion. The use of learning models makes the difference in student learning outcomes before and after the treatments and student learning outcomes. Problem solving based scientific learning model is higher than student learning outcomes with conventional learning models.

There is also an increase in student learning outcomes by 0.394 (39.4%). So, the problem solving-based scientific learning model is effective in improving student learning outcomes in learning theme 8 sub-theme 3. A positive effect means that if motivation increases, learning outcomes will increase, so that increased motivation will accompany increased learning outcomes and the magnitude of the effect of motivation scores on each outcomes is 24.55%. Students responded very well to learning theme 8 and sub theme 3 using problem solving- based scientific learning model. It can be concluded that this learning model is is very effective and recommended to be applied in elementary schools.

ACKNOWLEDGMENT

The author would like to thanks to the principals, teachear and student off class IV SDN Kluwut 02 and SDN Grinting 01 of Brebes District.

REFERENCES

Akhiruddin, Herawati & Susilo, I. (2016). Dipadu Pjbl Berbahan Ajar Potensi Lokal terhadap Keterampilan Proses Sains. *Jurnal Pendidikan*, (2013), 1964-1968.

Astika, I. K. U., Suma, K., & Suastra, I. W. M. 2013. Pengaruh Model Pembelajaran dengan Masalah (*Problem Based Learning*) terhadap sikap ilmiah dan Keterampilan Berpikir Kritis. *Jurnal Penelitian Pascasarjana Undiksha*, 3(1). Retrieved from http://oldpasca.undiksha.ac.id/e-journal/index.php/jurnal_ipa/article/view/851

Fitri, H., Dasna, I. W., & Suharjo. (2018). Pengaruh Model *Project Based Learning* (PjBL) Terhadap Kemampuan Berpikir Tingkat Tinggi Ditinjau dari Motivasi Berprestasi Siswa Kelas IV Sekolah Dasar. *Briliant Jurnal Riset dan Konseptual*, 3(2),201-212.

Giwanti, T., I., Prasetyo, A., P., B., Banowati E. Kemampuan Literasi Sains dan Hasil Belajar Siswa Pada Pembelajaran Berbasis Proyek(PjBL). *Journal of Primary Education*10(3),242-247. Retrieved from

Hamdu, G & Agustina, L. (2011). Pengaruh Motivasi Belajar Siswa Terhadap Pestasi Belajar Ipa Di Sekolah Dasar. *Jurnal Penelitian Pendidikan.* 12(1), 1412-565. Retrieved from http://jurnal.upi.edu/file/8Ghullam_Hamdu.pdf

Hosnan. M (2014). *Pendekatan Saintifik dan Konstektual dalam Pembelajaran Abad 21*, Bogor: Ghalia Indonesia.

Hyytinen, H., Toom, A., & Postareff, L. (2018). Unraveling the complex relationship in critical thinking, approaches to learning and self-efficacy beliefs among first-year educational science students. *Learning and Individual Differences*,67(3), 132-142.

Nugraha A., J., Suyitno H., & Susianingsih E. Analsis Kemampuan Berpikir Kritis Ditinjau dari Keterampilan Proses Sains dan Motivasi Belajar melalui Model *PBL*. *Journal of Primary Education*, 6(1), 35-43

Nurhabibah, S., Hidayat, A., & Mudiono, A. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Keterampilan Proses Sains dan Hasil Belajar Muatan IPA di Kelas IV. *Jurnal Pendidikan*, 3(10), 1286–1293.

Ramadhany, A. Purnomo, A., & Suryadi, A. 2016. Pengaruh Penggunaan Model Pembelajaran Project Based Learning Pada Pembelajaran Sejarah terhadap Hasil Belajar Siswa Kelas XI IPS MAN Temanggung. *Indonesian Journal of History education*,4(2),1420.

Salu, B. (2019). Pengaruh Strategi Penemuan Terbimbing terhadap motivasi belajar siswa kelas IV SDN 1 Rantepao Kabuoaten Toraja Utara. *Journal of Chemical Information and Modelling*, 4(3), 664-664.

Setyaningrum D., Florentinus Y., S., & Saptono S. Implementasi Predict Observe ExplainModel dan Ootdoor Guided Inquiry dalamMeningkatkan Pemikiran Kritis Siswa dalam Pembelajaran Sains. *Journal of Primary Education*, 10(3), 248-253.

Sulistyorini, E & Kristin, F. (2018). Penerapan Role Playing Untuk Meningkatkan Motivasi dan Hasil Belajar IPS Kelas V, *Jurnal Pendidikan Dasar*,8(1),44-54. Retrieved from http://journal.unj.ac.id/unj/index.php/jpd/article/5340

Widyaningrum D., Sugiharto DYP., & Sugiyo. Penerapan Pembelajaran dengan Pendekatan Saintifik di TK Negeri Pembina Nalumsari Jepara. *Journal of Primary Education*, 6(1), 44-49.

Wijanarko, A. G., Supardi, K. I., & Marwoto, P. (2017). Keefektifan Model Project Based Learning Terbimbing untuk Meningkatkan Keterampilan Proses Sains dan Hasil Belajar IPA. *Journal of Primary Education*, 6(2), 120–125.

Yudha, C, B. (2018), Peningkatan Motivasi Belajar Siswa Pada Mata Kuliah Konsep Dasar Matematika Melalui Pendekatan Contextual Teaching And Learning, JPD: *Jurnal Pendidikan Dasar,*9(1),12-27. Retrieved from http://journal.unj.ac.id/unj/index.php/jpd/issue/view/JPD.091