IJE
Interdiciplinary Journal of Education
https://skillerindonesia.id/index.php/ije/index

Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

Meta Analysis Of Learning Models Problem Based Learning In Improving Critical Thinking Skills In Primary Schools

Muhammad Sururuddin[1*], Ni Ketut Suarni[2], I Gede Margunayasa[3]
[1*]Universitas Hamzanwadi, Selong, Indonesia
[2,3]Universitas Pendidikan Ganesha, Indonesia

*Corresponding Author. Email: sururuddin@hamzanwadi.ac.id

Abstract: This study aims to analyze Problem-based Learning models intended to improve critical thinking skills in elementary school students. Problem-based learning models are learning processes where students are open minded, reflexive, active, reflective, and critical through real-world context activities. In this study the researchers used a meta-analysis method. First, the researcher formulated the research problem, then proceeded to review the existing relevant research for analysis. Data were collected by using a non-test technique by browsing electronic journals through Google Scholar and studying documentation in the library. Seven articles were found through Google Scholar and only one was found in the library. Based on the analysis of the results, the problem-based learning model can improve students' thinking ability from as little as 2.87% up to 33.56% with an average of 14.18%.

Article History
Received: 12-01-2024
Revised: 20-03-2024
Published: 30-01-2024

Key Words:
Problem Based Learning, Critical Thinking, Elementary School

How to Cite: Sururuddin, M., Suarni, N. K., & Margunayasa, I. G. (2024). Meta Analysis Of Learning Models Problem Based Learning In Improving Critical Thinking Skills In Primary Schools. *IJE : Interdisciplinary Journal of Education*, *2*(1), 12–18. https://doi.org/10.61277/ije.v2i1.72

https://doi.org/10.61277/ije.v2i1.72

Introduction

Education has a very important role for the development of a country. The quality of a country's education is influenced by many factors. The quality of education is determined by several factors, curriculum, teachers or teaching staff, facilities and learning resources. Teachers have an important role in improving the quality of learning in the classroom. To improve the quality of learning, teachers can carry out innovative learning in the classroom. Innovative learning prioritizes students as the center of learning. This is in line with the opinion of Rini Kristiantari (2014) who states that the role of teachers in the learning process remains the key to the success of education. One learning model that places students as learning is Problem Based Learning. (PBL).

Literature review

Perkins (1993, p. 8) states that learning is the impact of thinking. Retention, understanding, and active use of knowledge can be created only by learning experiences in which students think about, and think with, what they are learning (in Eggen and Kauchak, 2012).

IJE
Interdiciplinary Journal of Education
https://skillerindonesia.id/index.php/ije/index
Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

Problem Based Learning

Good learning in the classroom can foster students' understanding of concepts and foster students' way of thinking. There are many models that are able to foster students' understanding of concepts and ways of thinking, one of which is the Problem Based Learning (PBL) learning model. Problem Based Learning (problem-based learning) is a set of teaching models that use problems as a focus to develop problem solving skills, materials, self-regulation (Hmelo-Silver, 2004).

According to Ali Mushon (2009, p. 173) Problem Based Learning is a learning method that uses problems as the first step in collecting and integrating new knowledge. Apart from that, it is supported by the opinion of Syahroni Ejin (2016) who states that Problem Based Learning (PBL) is a learning model where students are faced with real life (contextual) problems from the environment so that it can improve students' ability to understand concepts and think critically. According to Rahmadani and Anugraheni (2017) stated that PBL emphasizes problem solving activities in learning. Through the PBL approach, students learn through problem solving activities that can hone students' thinking skills. Problem Based Learning is learning that uses real world problems as a context for students to learn critical thinking and problem solving skills, as well as to gain essential knowledge and concepts from the subject matter (Yunin Nurun Nafiah and Wardan Suyanto, 2014).

According to Paul Eggen and Don Kauchak (2012, p. 310) Problem Based Learning consists of phases in applying learning, namely: 1) reviewing and conveying problems, 2) developing strategies, 3) implementing strategies, 4) discussing and evaluating results. In the first phase of reviewing and conveying the problem, the teacher is able to review the knowledge needed to solve the problem and give students specific and concrete problems to be solved. The second phase is developing strategies, meaning that students are able to develop strategies to solve problems and the teacher gives students feedback on strategies. The third phase applies strategies, meaning that students are able to apply strategies in solving problems and teachers carefully monitor and provide feedback to students. The fourth phase is discussing and evaluating results, where the teacher guides the discussion about students' efforts and the results they get. Sudarman (2007) states that the basis of Problem Based Learning is a collaborative process. Students construct knowledge by building reasoning from all previous knowledge and from everything obtained as a result of interacting with fellow individuals. Susanti, A. E, & Suwu, S. E. (2016) argue that Problem Based Learning (PBL) is learning that can develop students' critical thinking skills, through asking and answering questions, analyzing and solving problems both in groups and individually. Meanwhile, Hmelo-Silver & Barrows (2006) stated that the problem that arises in Problem Based Learning is that the questions given do not have a single answer, meaning that students must be involved in exploration with several answer solutions. Student involvement in Problem Based Learning learning activities can help develop students' critical thinking skills, because in Problem Based Learning learning activities students are fully involved in learning process activities through problem solving in elementary schools. In Problem Based Learning activities, students can develop critical thinking skills as a step in solving problems and can draw conclusions based on what they understand.

So the Problem Based Learning learning model or problem-based learning model is a learning model that involves students in learning activities and prioritizes real problems in the

Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

school, home or community environment as a basis for gaining knowledge and concepts through critical thinking and problem solving skills.

Critical thinking

According to Van Gelde (2005) & Willingham (2007) critical thinking is a person's ability and tendency to make and assess conclusions based on evidence (in Eggen and Kauchak, 2012). Maulana (2008) states that by thinking critically, a person can organize, adjust, change or improve his thoughts, so that he can make decisions to act more appropriately.

Critical thinking skills in mathematics learning can be developed in schools and universities. According to Maulana (2008, p. 39) critical thinking focuses on systems, structures, concepts, principles, as well as tight connections between one element and other elements. Johnson (2007, p. 189) explains that critical thinking is a thinking hobby that is developed by every person, both at the elementary, middle and high school levels. The importance of mathematics from the start, especially elementary school, means it is necessary to find a solution, namely a way to manage the teaching and learning process of mathematics at the elementary school level so that mathematics can be understood well by elementary school students.

Based on the opinion above, it is important to develop students' critical thinking skills from an early age, especially from elementary school, so it is absolutely necessary to have a mathematics learning process that involves students actively, especially in the learning process in the classroom. The success of the learning carried out is determined by the learning process implemented. Therefore, researchers tried to analyze the improvement in students' thinking processes, especially in elementary schools.

Research methods

The type of research used is meta-analysis. Meta analysis is research carried out by researchers by summarizing research data, reviewing and analyzing research data from several previously existing research results. Research data was collected by researchers by searching for articles in online journals, thesis or dissertation results in repositories, using Google Cedekia. The keywords used by researchers in searching articles are "Problem Based Learning", "Critical Thinking".

From a search using the keywords "Problem Based Learning" and "Critical Thinking" several articles were obtained and then articles were selected that met the Problem Based Learning criteria to improve critical thinking, namely the availability of data before action and after action in the form of scores. Then the score obtained is analyzed by looking for the percentage. The analysis technique used uses a comparative method to determine the impact of implementing the Problem Based Learning learning model. The analysis used in this research is to compare the difference in scores before the Problem Based Learning learning action and after the Problem Based Learning learning action as the amount of improvement, then divide the score before the Problem Based Learning learning action (in the form of %) to determine the magnitude of the influence of the learning action on ability students' critical thinking.

IJE
Interdiciplinary Journal of Education
https://skillerindonesia.id/index.php/ije/index
Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

Results and Discussion

The research results obtained 23 articles related to the Problem Based Learning learning model in improving elementary school students' critical thinking. Data on article titles and authors as well as codes are in the attachment.

The data from the research report is still very extensive but only 8 relevant articles were taken. The article data is processed by summarizing and determining the essence of research results using Problem Based Learning. Then the data is reported back in a qualitative and quantitative descriptive manner. Data from the analysis of the Problem Based Learning model can be seen as follows:

Table 1. Percentage of Increased Student Critical Thinking

No	Data Code	Pretest score	Posttest score	improvemente
1	X1	78,57	92,85	14,2
2	X2	68,9	93,10	24,
3	X3	69,05	81,02	11,9
4	X4	56,76	67,72	10,9
5	X5	79,42	82,29	2,8
6	X6	40,63	74,19	33,5
7	X7	76,54	82,55	6,0
8	X8	75,67	85,29	9,6
9	X9	40,84	59,16	18,3
10	X10	44,96	55,04	10,0
11	X11	34,01	65,99	31,9
12	X12	47,29	52,71	5,4
13	X13	34,47	65,53	31,0
14	X14	46,88	53,13	6,2
15	X15	75,67	85,29	9,6
16	X16	44,32	55,68	11,3
17	X17	44,24	55,76	11,5
18	X18	45,01	54,99	9,9
19	X19	45,85	54,15	8,3
20	X20	46,86	53,14	6,2
21	X21	45,39	54,61	9,2
22	X22	48,11	51,89	6,0
23	X23	42,19	57,81	15,6
	Mean	43.60	58.33	12.7

Based on table 1 above, it shows that the Problem Based Learning learning model can improve the Critical Thinking abilities of Elementary School Students. The average percentage of improvement in students' critical thinking by learning using Problem Based Learning starts from the lowest 2.87% to the highest 33.56% with an average of 12.73%. The average critical thinking of students before using Problem Based Learning was 43.60%, increasing to 58.33%. The average value of one month of Problem Based Learning (PBL) learning and after Problem Based Learning (PBL) learning experienced a significant increase

IJE
Interdiciplinary Journal of Education
https://skillerindonesia.id/index.php/ije/index
Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

of 12.73%. This is shown from the results of different test analysis. The following are the results of the Paired-Sample T Test Output, namely;

Table 2. Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	53.3226	23	14.99178	3.12600
	After	66.5600	23	14.26465	2.97438

Table 3. Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Before & after	1.32374E1	8.96638	1.86962	-17.11474	-9.36004	-7.080	22	.000

Table 2 above shows that mathematics learning using Problem Based Learning (PBL) is able to increase students' critical thinking from an average value of 53.3226 to 66.5600. Table 3 shows that there is a relationship between the average value of students' critical thinking before learning using Problem Based Learning (PBL) and after learning using Problem Based Learning.

Hypothesis test results, Ho = there is no significant difference in students' critical thinking before learning with Problem Based Learning (PBL) and H1 = there is a significant difference in students' critical thinking before learning with Problem Based Learning (PBL) and after learning with Problem Based Learning (PBL). From table 3 it appears that the value of Sig (0.00) < α (0.05) and Table 4 shows that the value of t = -7.080 < t table = 1.714 so Ho is rejected. So it can be concluded that there is a significant difference in students' critical thinking before learning Problem Based Learning (PBL) and after learning Problem Based Learning (PBL).

Based on the research results above, it can be seen that each research conducted obtained different percentage results of increased critical thinking. The author analyzes that the differences in research results carried out by these researchers are caused by internal and external factors. Internal factors are factors that exist within the student himself (such as: health, interests, talents, intelligence, body condition), while external factors are factors that come from outside the student, namely family factors, school environment and community environment (relationships). with neighbors).

The background of the research location also influences the research results obtained because they come from different areas. Students' ability levels are also different so this also influences the learning outcomes obtained. The student's health condition is also an influence, because it could be that when the researcher collects research data, the student's health condition is sick so they are not optimal in carrying out the assignments given by the teacher.

Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

The application of different curricula can also impact learning outcomes. Apart from that, even though the learning process carried out by the teacher uses the same type of model, there is a possibility that the implementation will be different.

Conclusion

Many researchers have implemented the Problem Based Learning (PBL) learning model. The results of the meta analysis show that the Problem Based Learning (PBL) model is able to increase students' critical thinking from the lowest 2.87% to the highest 33.56% with a significant increase of 12.73%.

References

Anindyta, P., & Suwardjo. (2014). Pengaruh problem based learning terhadap keterampilan berpikir kritis dan regulasi diri siswa kelas V. *Jurnal Prima Edukasia*, 2(2). DOI: https://doi.org/10.21831/jpe.v2i2.2720

Eggen, P., & Kauchak, D. (2012). *Strategi dan model pembelajaran: Mengajarkan konten dan keterampilan berpikir*. Jakarta, Indonesia: Indeks.

Ejin, Syahroni. (2016). Pengaruh model problem based learning (PBL) terhadap pemahaman konsep dan keterampilan berpikir kritis siswa kelas IV SDN Jambu Hilir Baluti 2 Pada Mata Pelajaran Ilmu Pengetahuan Alam. *Jurnal Pendidikan, 1(1), 65 – 71*. DOI: https://doi.org/10.26740/jp.v1n1.p66-72

Hmelo-Silver, C. E., & Barrows, H. S. (2006). Goals and strategies of a problem- based learning facilitator. *The Interdisciplinary Journal of Problem-Based Learning, 1(1),* 21-39. DOI: https://doi.org/10.7771/1541-5015.1004

Johnson, E. B. (2007). *Contextual teaching and learning: Menjadikan kegiatan belajar mengajar mengasyikkan dan bermakna*. Bandung, Indonesia: Mizan Learning Center (MLC)

Kristiantarai, M. R. (2014). Analisis kesiapan guru Sekolah Dasar dalam mengimplementasikan pembelajaran tematik integratif menyongsong kurikulum 2013. *Jurnal Pendidikan Indonesia, 3(2), 460 – 470*. DOI: https://doi.org/10.23887/jpi-undiksha.v3i2.4462

Maulana. (2008). Pendekatan metakognitif sebagai alternatif pembelajaran matematika untuk meningkatkan kemampuan berpikir kritis mahasiswa PGSD. *Jurnal Pendidikan Dasar, 10, 39-46*. Retrieved from http://file.upi.edu/Direktori/JURNAL/PENDIDIKAN_DASAR/Nomor_10-Oktober_2008/Pendekatan_Metakognitif_Sebagai_Alternatif_Pembelajaran_Matematika_Untuk_Meningkatkan_Kemampuan_Berpikir_Kritis_Mahasiswa_PGSD.pdf

Muhson, A. (2009). Peningkatan minat belajar dan pemahaman mahasiswa melalui penerapan problem based learning. *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, 39(2), 171 – 182. Retrieved from https://journal.uny.ac.id/index.php/jk/article/view/212

Nafiah, Y. N., & Suyanto, W. (2014). Penerapan model problem based learning untuk meningkatkan keterampilan berpikir kritis dan hasil belajar siswa. *Jurnal Pendidikan Vokasi, 4(1)*, 125 – 143. DOI: http://dx.doi.org/10.21831/jpv.v4i1.2540

Vol. 2, No 1: March 2024
E-ISSN: 2988-7798
pp. 12-18
Email:ije@skillerindonesia.com

Rahmadani, N., & Anugraheni, I. (2017). Peningkatan aktivitas belajar matematika melalui pendekatan problem based learning bagi siswa kelas 4 SD. *Jurnal Scholaria, 7(3)*,241–250. DOI: https://doi.org/10.24246/j.scholaria.2017.v7.i3.p241-250

Sudarman. (2007). Problem based learning: Suatu model pembelajaran untuk mengembangkan dan meningkatkan kemampuan memecahkan masalah. *Jurnal Pendidikan Inovatif, 2(2),* 68-73. Retrieved from http://physicsmaster.orgfree.com/Artikel%20&%20Jurnal/Wawasan%20Pendidikan/PBL%20Model.pdf

Susanti, A. E, & Suwu, S. E (2016). Penerapan Pembelajaran Berbasis Masalah untuk Meningkatkan Ketrampilan Berpikir Kritis Siswa Kelas IX dalam Pelajaran Ekonomi. *Jurnal POLYGLOT, 12(1),* 66-81. DOI: https://doi.org/10.19166/pji.v12i1.383

