Jurnal Profesi Keguruan
Vol. 10 Issue 1 (2025) 49-65
DOI: https://doi.org/10.15294/jpk.v10i1.10861
Available online since June 30, 2025

Jurnal Profesi Keguruan
https://journal.unnes.ac.id/journals/jpk

The Effectiveness of Problem-Based Learning Assisted by Animated Videos in Improving Critical Thinking Skills

Firda Nurul Khoiriyatul✉
Universitas Negeri Semarang, Indonesia
Abdul Aziz
SMA Negeri 1 Sragen, Indonesia
✉ firdanurul86@students.unnes.ac.id

Abstract

This study aims to analyze the effectiveness of problem-based learning (PBL) assisted by animated video in improving students' critical thinking skills in class XI SMA Negeri 1 Sragen. This type of research is quasi-experimental in the form of a nonequivalent control group design. The sampling technique used is purposive sampling. Then this study has 2 classes, XI Economics-3B as an experimental class and XI Economics-E as a control class. This study used a paired sample t-test to test the hypothesis and an N-gain score to examine the effectiveness of the teaching and learning model. The result of data analysis in the experimental class has Sig. value (2-tailed) of 0,001, which is less than the level of significance, 0.05. This indicates that there are significant differences between the classes that used animated video as a teaching medium and those that followed conventional teaching methods. The result of the effectiveness analysis N-gain test obtained a score of 0.42, meaning that the effectiveness of the learning model applied in the experimental

class is included in the medium category. This study concludes that there are differences in the problem-based learning (PBL) model assisted by animated video in strengthening the critical thinking skills of students in class XI at SMA Negeri 1 Sragen.

Keywords

animated video; critical thinking skills; effectiveness of learning; problem-based learning

I. Introduction

The learning system in the 21st century is no longer centered on educators (teacher-centered learning) but centered on learners (student-centered learning). So, humans in this century must have innovative skills and characteristics. Thinking and learning skills in the 21st century are known as "The 4C Skills," formulated by the Framework Partnership of 21st Century Skills (Wijayanto et al., 2023). These include communication, collaboration, critical thinking, and problem-solving, as well as creativity and innovation. To instill these skills in students, educators must develop both hard and soft skills during their learning at school, enabling them to enter the workforce and compete with other countries (Septikasari & Frasandy, 2018).

In the modern era, students' critical thinking skills have become an important cornerstone of learning. Critical thinking is a directed thought process for solving problems, making decisions, and analyzing before acting (Haryadi et al., 2015). Critical thinking skills help students identify weaknesses in their thinking. They encourage students to reflect on their approach and understanding and involve a continuous process of self-improvement, with better

awareness and improved overall student ability (Komara et al., 2023).

Problem-based learning (PBL) is one of the learning models that can improve 21st-century skills, especially critical thinking skills. The problem-based learning (PBL) model is one that is capable of providing active learning situations for students. This model trains students to solve problems based on scientific stages (Utomo et al., 2019). Critical thinking skills developed with the application of problem-based learning (PBL) include the ability to identify, analyze, and solve problems creatively; the ability to determine the right solution in solving problems; the ability to ask or criticize problems from other groups; and the ability to answer questions and express opinions during presentations appropriately based on appropriate learning resources (Fakhriyah, 2014).

According to interviews with Mr. Abdul Aziz, S.Pd., an economics teacher for class XI at SMA Negeri 1 Sragen, he stated that student interest in learning is perceived as less than optimal, resulting in a low ability for students to think critically. Additionally, the learning atmosphere causes students to feel more bored while listening to the teacher's explanation. This situation forces the teachers to provide innovations to the teaching and learning process through various efforts, including learning models and interactive and innovative learning media.

Currently, the teacher has implemented a problem-based learning (PBL) learning model, but the application is considered not optimal, so it requires learning media to support innovative learning. The media that teachers have used during learning is Microsoft PowerPoint, sometimes interspersed with videos sourced from YouTube. As for facilities and infrastructure, they support

the learning process, such as LCDs, projectors, and internet networks that should be maximally utilized.

Students' ability to think critically is still considered low in economics, as learning outcomes indicate that some students receive scores below the standard of completeness. Economics is one of the subjects that studies facts about a phenomenon and concepts associated with life. In addition, economics lessons provide analysis and understanding tools useful for overcoming everyday life situations and making better decisions. Let's assume that a conventional learning model, like the lecture method, imparts the economics subject in a monotonous manner. In that case, students' ability to think at a higher level will be less developed. This challenge makes teachers provide innovations to the teaching and learning process through various efforts, including learning models and interactive and innovative learning media.

Table 1. Daily Test Scores of National Income and Economic Gap Students of SMA Negeri 1 Sragen

	XI Economics-3B		XI Economics-E	
	UH 1	UH 2	UH 1	UH 2
Average	65.8	65	58.4	58.5
Highest	96.7	97.5	93.3	95
Lowest	20	22	30	30
Number of students	36	36	36	36
completeness (%)	33%	39%	14%	19%

(Source: Secondary data processed by researchers, 2023)

Table 1. The average learning outcomes of students in class XI Economics showed an increase of 6% in class XI Eko-3B and by 5% in class XI Eko-E, but the level of completeness is still far below 50%. Mr. Abdul Aziz, S.Pd., added that student involvement during the learning process was less active due to monotonous learning activities. Although it has used problem-based learning (PBL) and the addition of watching related YouTube videos during the learning process, the application cannot be maximized.

Related to the phenomenon described about the problems faced, it is necessary to develop learning models and media such as problem-based learning (PBL) optimally. This is expected to reduce students' difficulties in understanding the concepts of learning materials. Incorporating interactive and innovative media can make the learning atmosphere comfortable so students can be actively involved in the learning process.

Based on this, the authors are interested in using a problem-based learning (PBL) model assisted by animated videos, which are expected to improve students' critical thinking skills. With research entitled "The Effectiveness of Problem-Based Learning (PBL) Assisted with Animated Video in Improving Students' Critical Thinking Ability (Experimental Study of Grade XI Inflation Material)."

Wijaya (2015) stated that learning is an individual activity that can improve individuals' lives due to interactions between individuals and individuals and individuals with the environment. Student activeness during the teaching and learning process is one of the keys to achieving educational goals. Using methods, teaching and learning approaches, and learning orientation causes each student's activity to vary.

Mudlofir & Rusydiyah (2017). Vygotskian constructivism views knowledge as being constructed collaboratively between individuals, and each individual can adjust to the situation. The problem-based learning (PBL) model is in line with the theory of constructivism because this theory gives students who want to learn or seek knowledge the freedom to find their wants or needs, thus providing students with the activeness to learn to find their competencies, knowledge, technology, and other things needed to develop themselves (Sugrah, 2019).

Winarti (2020) stated that High-Order Thinking Skills (HOTS) are a higher level of thinking that requires the ability to analyze, reason, and evaluate with one's own thoughts and not just memorize facts or restate a concept/phenomenon. Through HOTS, questions used in learning can encourage students to develop critical thinking skills to think deeper and wider.

II. Method

This study employs a quantitative approach, as the data is numerical and analyzed using statistical methods. It adopts a quasi-experimental design, commonly referred to as a pseudo-experiment. According to Cook (1979), a quasi-experiment is defined as an experiment with treatment, measurement of impact, and experimental units but does not use random assignment to create comparisons to conclude changes caused by treatment (Abraham & Supriyati, 2022). Meanwhile, this research design uses the Nonequivalent Control Group Design form. The design provides a pretest before treatment and provides a posttest after treatment in each group. In this study, the experimental class was given the treatment

of problem-based learning assisted by animated video, while the control class was given the treatment of ordinary problem-based learning without using animated video media.

Table 2. Research Design: Nonequivalent Control Group Design

Group	*Pretest*	Treatment	*Posttest*
Experimental	O_1	X	O_2
Control	O_3	-	O_4

(Source: Sugiyono, 2015)
Description:
O_1: experimental group pretest
O_2: posttest of experimental group
O_3: control group pretest
O_4: posttest of control group
X: treatment in the form of problem-based learning (PBL) assisted by video-animated

Population is a generalization area consisting of objects/subjects that have certain qualities and characteristics set by researchers to study and then draw conclusions (Sugiyono, 2017). This study uses the population of SMA Negeri 1 Sragen students in grade XI who get economics subjects.

The sample is part of the number and characteristics possessed by the population (Sugiyono, 2017). In this study, the samples were the XI Economics-3B class as the experimental class and XI Economics-E as the control class.

This study used purposive sampling, which has certain considerations (Sugiyono, 2015). The sample consideration in this study looked at the characteristics and abilities of the two classes, which were relatively the same based on the similarity of teachers

and the learning outcomes of economic subjects in the 2023/2024 school year.

The research variable measured is students' critical thinking ability in applying problem-based learning (PBL) assisted by animated videos. The data collection techniques employed in this study included (1) observation techniques, (2) documentation techniques, and (3) test techniques that involved pretest and post-test learning outcomes.

The data analyses used in this study were (1) descriptive statistical analysis, (2) normality test, (3) homogeneity test, (4) independent sample t-test, (5) paired sample t-test, and (6) N-gain score test.

III. Result and Discussion

The results of this study include an analysis of student learning activities and learning outcomes of students' critical thinking skills.

Problem-Based Learning Model Assisted by Animated Video Can Increase Student Activity

We observed student learning activities taking place in both the experimental and control classes. In this study, data analysis of student activity between the two experimental and control classes consisting of several indicators, namely (1) paying attention to the teacher's explanation, (2) being active in asking questions, (3) being able to express opinions, (4) being engaged in tasks from the

teacher, and (5) collecting assignments on time. The following table presents the results of observations on student learning activities.

Table 3. Results of Observations of Student Learning Activities

Student Learning Activity		
Class	Experiment	Control
Average percentage	76%	52%
Category	Active	Less active

(Source: Processed research data, 2024)

Table 3 shows the average results of student activeness in experimental and control classes. In the experimental class, 76% of students were assisted by an animated video showing active criteria, which assisted a problem-based learning (PBL) model.

So, the problem-based learning model (PBL) assisted by animated video effectively increases student activity. In the control class, the problem-based learning (PBL) model using the lecture method was active at 52%, showing fewer criteria. This result means that using the model is less effective in increasing student activity.

Problem-Based Learning Model Assisted by Animated Video Can Improve Student Learning Outcomes

In this study, the data used to analyze student learning outcomes of inflation material in class XI Economics-3B and XI Economics-E SMA Negeri 1 Sragen are pretests given before treatment in the form of application of problem-based learning (PBL) assisted by animated video and posttests given after treatment in the form

of application of problem-based learning (PBL) assisted by animated video. The following table presents the results of the descriptive analysis of student learning outcomes.

Table 4. Descriptive Analysis of Learning Results

	Experiment class		Control class	
	Pretest	Posttest	Pretest	Posttest
N	36	36	36	36
Minimum	50	59	44	53
Maximum	78	94	78	88
Mean	63.17	78.56	62.89	73.83
Standard Deviation	9,164	11,668	11,024	10,064

(Source: Processed research data, 2024)

Table 4 shows a significant difference in the average learning outcomes of experimental and control class students. The average of the experimental class is higher than that of the control class. There was an increase of 15.39 in the experimental class compared to the control class, which was only 10.94.

Table 5. Normality Test Results

	Tests of Normality					
	Statistic			Shapiro-Wilk		
Statistic	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Experiment	,110	36	,200	,967	36	,358
Posttest Experiment	,126	36	,164	,943	36	,061

Pretest Control	,124	36	,173	,960	36	,221
Posttest Control	,068	36	,200	,978	36	,669

(Source: Processed research data, 2024)

From the data in table 5, the significant value in the Shapiro-Wilk test for the pretest of students' critical thinking skills in the experimental class is 0.358, and the posttest is 0.064; both results show a significant value of more than 0.05, which means that the data is normally distributed. While the significant value of the pre-test of students' critical thinking skills in the control class was 0.221 and the posttest was 0.669, both results showed a significant value of more than 0.05, meaning the research data is normally distrib-uted.

Table 6. Homogeneity Test Pretest

Test of Homogeneity of Variance			
	Pretest learning outcomes		
Levene statistic	df1	df2	Sig.
,250	1	70	,619

(Source: Processed research data, 2024)

The analysis of the pretest data from both the experimental and control classes shows a significance value (Sig.) greater than 0.05, specifically 0.619. These results indicate that the pretest data of both classes are homogeneous.

Table 7. Homogeneity Test Posttest

Test of Homogeneity of Variance			
	Posttest learning outcomes		
Levene statistic	df1	df2	Sig.
,456	1	70	,502

(Source: Processed research data, 2024)

Based on the posttest data analysis of both the experimental and control classes, the significance level (Sig.) is greater than 0.05, specifically 0.502. These results indicate that the posttest data of both classes are homogeneous.

Furthermore, an independent sample t-test was conducted to determine whether or not there was a difference in the pretest of the experimental and control classes. Based on the results of testing the data on the pretest values of the experimental and control classes, the Sig. > level of significance (0.05), which is 0.619 > 0.05, it can be concluded that the pretest data in both classes has no significant difference. This result indicates that both classes possess a similar level of initial ability.

The hypothesis tests carried out in this study were the paired sample t-test and the N-gain score test. The paired sample t-test is used to determine whether there is a difference in the average of two paired samples that have the same subjects but experience different treatments. The results of testing the data on the pretest and posttest values for both the experimental and control classes indicate that the significance (2-tailed) is less than the level of significance (0.05). Hypothesis testing based on the N-Gain score test is used to determine the difference or increase in posttest and pretest results

and the effectiveness of the treatment given during the learning process in the experimental and control classes. The results of the N-Gain score test for the experimental class were $0.30 \leq 0.42 < 70$, meaning that the effectiveness of the learning model applied was in the medium category. Based on this, it can be concluded that there is a significant difference in the average pretest and posttest scores, which means that problem-based learning (PBL) assisted by animated videos is effective in strengthening the critical thinking skills of SMA Negeri 1 Sragen students.

The results of this study are relevant to the research conducted by Rusdarti (2019), which states that problem-based learning (PBL) can improve students' problem-solving skills and motivation. In addition, another study conducted by Mardiyanti (2020) stated that problem-based learning (PBL) can significantly improve students' critical thinking skills. Tests measuring students' critical thinking skills utilize the Higher Order Thinking Skills (HOTS) critical thinking indicators. The test questions designed to assess students' higher-level thinking skills include analyzing questions, evaluating critical thinking abilities, and creating tasks that develop creative problem-solving skills (Febrianti et al., 2021).

Based on the findings in the field, students of class XI Economics-3B who were given treatment in the form of learning with a problem-based learning (PBL) model assisted by animated videos made students active during learning and enthusiastic about the learning process from beginning to end. The learning objectives assisted by animated videos provide stimulus and increase student learning motivation. The animated video contains the case of inflation and the learning theory of inflation so that students can easily

understand the material presented. Using animated video as learning material aligns with Sukiyasa & Sukoco (2013), which states that learning using animated media provides an overview that the material presented is clearer and closer to real.

Learning using the problem-based learning (PBL) model assisted with animated videos makes the critical thinking skills of students in class XI Economics-3B as an experimental class increase in student learning outcomes. According to researchers, based on observations of student learning activities, the learning model applied has a strategy that encourages students to be actively involved during learning. The activities are evident when discussing activities with groups to solve an inflation case that students find and then analyzing the causes and ways to overcome them.

IV. Conclusion

Based on the results of the study, it can be concluded that the problem-based learning model (PBL) assisted by animated videos is effective in increasing the learning activities of students in class XI Economics, and the problem-based learning model (PBL) is successful in strengthening the critical thinking skills of students in class XI Economics of SMA Negeri 1 Sragen.

V. References

Apriansyah, M. R. (2020). Pengembangan media pembelajaran video berbasis animasi mata kuliah Ilmu Bahan Bangunan di Program Studi Pendidikan Teknik Bangunan Fakultas Teknik Universitas Negeri Jakarta. *Jurnal Pendidikan*

Teknik Sipil (JPENSIL), 9(1), 9–18. https://doi.org/10.21009/jpensil.v9i1.12905

Ardianti, R., Sujarwanto, E., & Surahman, E. (2022). Problem-based learning: Apa dan bagaimana. *Diffraction, 3*(1), 27–35. https://doi.org/10.37058/diffraction.v3i1.4416

Arikunto, S. (2014). *Prosedur Penelitian (Suatu Pendekatan Praktik)*. Rineka Cipta.

Azizah, N., Fatmaryanti, S. D., & Ngazizah, N. (2014). Penerapan model pembelajaran konstruktivisme berbasis problem based learning (PBL) untuk meningkatkan kemampuan berfikir kritis pada siswa SMA Negeri 1 Kutowinangun kelas X tahun pelajaran 2013/2014. *Radiasi, 5*(2), 24–28.

Darwati, I. M., & Purana, I. M. (2021). Suatu model pembelajaran untuk mengembangkan cara berpikir kritis peserta didik. *Widya Accarya: Jurnal Kajian Pendidikan FKIP Universitas Dwijendra, 12*(1), 61–69.

Dewayanti, A., Suryanti, H. H., & Wicaksono, A. G. (2023). Analisis video animasi inovatif dalam pembelajaran IPA pada masa pandemi COVID-19 di MIM Girimargo Miri Sragen tahun pelajaran 2020/2021. *Jurnal Sinektik, 4*(2), 187–195. https://doi.org/10.33061/js.v4i2.6658

Esema, D., Susari, E., & Kurniawan, D. (2019). Problem-based learning. In *Learning and teaching in higher education: Perspectives from a business school* (pp. 139–151). https://doi.org/10.4337/9781788975087.00027

Fakhriyah, F. (2014). Penerapan problem based learning dalam upaya mengembangkan kemampuan berpikir kritis mahasiswa. *Jurnal Pendidikan IPA Indonesia, 3*(1), 95–101. https://doi.org/10.15294/jpii.v3i1.2906

Febrianti, W., Zulyusri, Z., & Lufri, L. (2021). Meta analisis: Pengembangan soal HOTS untuk meningkatkan kemam-

puan berpikir kritis peserta didik. *Bioilmi: Jurnal Pendidikan, 7*(1), 39–45. https://doi.org/10.19109/bioilmi.v7i1.9506

Haryadi, E. F., Priyono, A., & Retnoningsih, A. (2015). Desain pembelajaran literasi sains berbasis problem based learning dalam membentuk keterampilan berpikir kritis siswa. *Journal of Innovative Science Education, 4*(2), 1–7.

Hermansyah. (2020). Problem based learning in Indonesian learning. *Social, Humanities, and Education Studies (SHES): Conference Series, 3*(3), 2257–2262. https://jurnal.uns.ac.id/SHES

Komara, E., Berliana, B., Firman, M., & Gunawan, U. (2023). Implementation of project-based learning model to improve students' critical thinking skills. *Economic Education Analysis Journal, 12*(3), 192–198. https://doi.org/10.15294/eeaj.v12i3.75919

Oktavi, W., & Taufina, T. (2020). Penerapan model problem based learning (PBL) dalam pembelajaran tematik terpadu di kelas V Sekolah Dasar Oktavia. *E-Jurnal Inovasi Pembelajaran SD, 8*(6), 78–88. http://ejournal.unp.ac.id/students/index.php/pgsd/article/view/9057

Rusydiyah, A. M. E. F. (2017). *Desain Pembelajaran Inovatif (Teori Ke Praktik)*. Raja Grafindo Persada.

Septikasari, R., & Frasandy, R. N. (2018). Keterampilan 4C abad 21 dalam pembelajaran pendidikan dasar. *Jurnal Kependidikan Islam Tingkat Dasar, 8*(2), 107–117. https://doi.org/10.1016/j.jacc.2020.04.015

Sugiyono. (2015). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, Dan R&D.* Bandung: Alfabeta.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D.* Bandung: Alfabeta.

Sugrah, N. U. (2019). Implementasi teori belajar konstruktivisme dalam pembelajaran sains. *Humanika, 19*(2), 121–138. https://doi.org/10.21831/hum.v19i2.29274

Suparlan. (2019). Teori konstruktivisme dalam pembelajaran. *Islamika, 1*(2), 79–88. https://doi.org/10.36088/islamika.v1i2.208

Syamsidah, & Suryani, H. (2018). *Buku Model Problem Based Learning (Pbl)*. In *Buku*.

Tri Inayah, D., & Mahanani, C. (2022). Pengembangan media pembelajaran video animasi membatik teknik jumputan. *Jurnal Ilmiah Profesi Guru, 3*(2), 162–171. https://doi.org/10.30738/jipg.vol3.no2.a12704

Utomo, S. W., Joyoatmojo, S., Jutmini, S., & Suryani, N. (2019). Improving higher order thinking skills through problem based learning with a scientific approach. *Dinamika Pendidikan, 14*(1), 76–86. https://doi.org/10.15294/dp.v14i1.18776

Widiyasanti, M., & Ayriza, Y. (2018). Pengembangan media video animasi untuk meningkatkan motivasi belajar dan karakter tanggung jawab siswa kelas V. *Jurnal Pendidikan Karakter, 9*(1), 1–16. https://doi.org/10.21831/jpk.v8i1.21489

Wijaya, R. S. (2015). Hubungan kemandirian dengan aktivitas belajar siswa. *Jurnal Penelitian Tindakan Bimbingan dan Konseling, 1*(3), 40–45.

Winarti, E. I. (2020). *Taksonomi: Higher order thinking skill (HOTS)*. W.S.P. Salatiga.