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The Effectiveness of Hybrid Project-Based Learning Model in Improving Primary Teacher Education Students' Critical Thinking and Creative Thinking Skills

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Efektivitas Model Pembelajaran Berbasis Proyek Hybrid Dalam Meningkatkan Kemampuan Berpikir Kritis Dan Berpikir Kreatif Siswa Pendidikan Guru Sekolah Dasar

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ABSTRACT

Abstract: *This paper examines the effectiveness of the hybrid project-based learning model to improve students' critical thinking and creative thinking skills. The research is quantitative research with a pretest-posttest control group design. The subjects involved elementary school teacher education students in the second semester of the academic year 2022/2023 at Universitas Muhammadiyah Lamongan. The research can be applied to students during the learning process. The measured research data were validity, practicality, and effectiveness of the research instrument. The results indicate that (a) the result of validity testing of the developed hybrid project-based learning model was very valid with a percentage of 94%. In addition, (b) the questionnaire analysis result of students' responses in the experimental class was very good with a percentage of 94% while the result in the control class was 69% in the unfavorable category. Moreover, (c) the t-test analysis 0.023 < 0.05 with the N-Gain test results was 79.20%, which means that there was a significant difference and an increase in students' critical thinking skills. And (d) the t-test analysis 0.019 <0.05 with the N-Gain test results was 77.11%, which means that there was a significant difference and an increase in students' creative thinking skills. In conclusion, the hybrid project-based learning model is feasible to use and can improve students' critical thinking and creative thinking skills.*

Keywords: hybrid project-based learning model, critical thinking skill, creative thinking skill

Abstrak: Artikel ini mengkaji efektivitas model pembelajaran berbasis proyek hibrid untuk meningkatkan keterampilan berpikir kritis dan keterampilan berpikir kreatif siswa. Penelitian merupakan penelitian kuantitatif dengan desain penelitian *Pretest-Posttest Control Group Design*. Subjek penelitian melibatkan mahasiswa PGSD semester 2 Tahun Ajaran 2022/2023 Universitas Muhammadiyah Lamongan. Penelitian dapat diterapkan pada mahasiswa ataupun siswa dalam proses pembelajaran. Data penelitian yang diukur adalah validitas, kepraktisan, dan efektivitas instrumen penelitian. Hasil penelitian menunjukkan bahwa (a) hasil uji validitas perangkat model pembelajaran berbasis proyek hibrid yang dikembangkan sangat valid dengan persentase sebesar 94%. Selain itu, (b) hasil analisis angket respon mahasiswa kelas eksperimen sangat baik dengan persentase sebesar 94% sedangkan untuk kelas kontrol sebesar 69% dengan kategori kurang baik. Selanjutnya, (c) hasil analisis uji-t 0,023 < 0,05 dengan hasil uji N-Gain skor sebesar 79,20%, yang dapat diartikan adanya perbedaan yang signifikan dan peningkatan terhadap keterampilan berpikir kritis mahasiswa. Dan (d) hasil analisis uji-t 0,019 < 0,05 dengan hasil uji N-Gain skor sebesar 77,11 %, dapat diartikan adanya perbedaan yang signifikan dan peningkatan terhadap keterampilan berpikir kreatif siswa. Kesimpulannya, perangkat model pembelajaran berbasis proyek hibrid yang dikembangkan layak digunakan untuk meningkatkan kemampuan berpikir kritis dan kreatif mahasiswa.

Kata Kunci: ***model pembelajaran berbasis projek hibrid, keterampilan berpikir kritis,***

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INTRODUCTION

The development of technology and information has now entered to educational field, so teachers and lecturers are starting to design innovative learning (López-Pérez, M. V., Pérez-López, M. C., & Rodríguez-Ariza, 2011). One of the efforts to integrate technology in education is the application of hybrid learning (Kaur, 2013), or known as blended learning (Husamah, 2015). This learning process combines the process of delivering material online, offline, and mobile. Face-to-face learning has been implemented at various levels of education (Kaur, 2013; Napier, N. P., Dekhane, S., & Smith, 2011). The application of hybrid learning has a significant impact on the educational environment. During the Covid-19 pandemic and post-pandemic, it has become the discourse of the Indonesian government to implement hybrid learning (Firdausi, 2020).

When students study online, they find it difficult to construct work in lectures. The lack of a learning paradigm which promotes project-based learning in online education is the source of this problem. Consequently, there is a need for online learning innovations which enable students to create projects as a result of their learning. Students are productive individuals which can accommodate their demands to produce or make products. Furthermore, online education provides more freedom and encourages students to seek independent learning (Sadikin, A., & Hamidah, 2020; MZ, A. S. A., Mudayan, A., Mubarok, M. S., & Dewantari, 2022).

The use of hybrid project-based learning (HPjBL) is expected to improve learning outcomes. Learning outcomes are an important component of learning (Sudjana & Ibrahim, 2009). Learning outcomes are changes in behavior in terms of the cognitive, affective, and psychomotor domains (Dimyati, 2006). In addition, it is stated that learning outcomes are the results of interaction learning. The level of students' ability has a significant impact on the learning outcomes they achieve. According to Clark, 70% of student learning outcomes in schools are determined by student abilities and 30% is by environment (Sudjana & Rivai, 2001).

Although various studies have shown the advantages of hybrid learning, the teacher/lecturer must determine the right design to achieve the expected learning outcomes. A good and effective learning process will help students achieve competencies that are formulated in optimal learning objectives (Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, 2013). The focus on this research was students as research objects. Quality learning can facilitate students to prepare themselves as individuals who can compete in the world of work (McFarlane, 2013), and master life skills and thinking skills (Buku, M. N. I., Mite, Y., Fauzi, A., Widiansyah, A. T., & Anugerah, 2015; Masigno, 2014; Wilson, 2016). Thinking skills are divided into critical thinking and creative thinking (Anjarsari, 2014). These thinking skills are the 21st century skills. Therefore, the learning process is expected to improve students' 21st century skills. In this case, lecturers must be able to develop skills such as problem solving and creative thinking to overcome world challenges (Osman, K., Tuan Soh, T. M., & Arsad, 2010).

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The 21st century skills are highly demanded in today's era (Ersoy, E., & Başer, 2014; Ritter, S. M., & Mostert, 2017). Students who are trained in 21st century skills will be flexible, see opportunities, and face challenges in a rapidly evolving world (Ritter, S. M., & Mostert, 2017). Given the importance of thinking skills, many educators are focusing on preparing students for the 21st century (Trilling, 2012; Conley, 2007; Drew, 2012). As the main component that interacts the most with students, lecturers are expected to be able to design learning that empowers students' thinking abilities optimally (Nagappan, 2010).

One of the 21st century competency learning models is project-based learning or PjBL (Blevins, 2018). Students will participate in the PjBL learning process actively and independently (Kokotsaki, D., Menzies, V., & Wiggins, 2016). PjBL is also considered as a suitable form of learning for students in scientific studies (Movahedzadeh, F., Patwell, R., Rieker, J. E., & Gonzalez, 2012). Various studies have been conducted to assess the impact of PjBL. However, modification of learning activities with the PjBL model is rarely carried out. In learning during a pandemic, it is not easy to carry out face-to-face learning as a whole so PjBL can be implemented in a hybrid manner. In light of the explanation, researchers carried out research by modifying the hybrid PjBL model to improve students' critical and creative thinking skills.

THEORETICAL SUPPORT

Hybrid Project Based Learning

Hybrid learning is a combination of face-to-face learning activities and online learning based on computer and internet technology (Nurdiansah, I., & Makiyah, 2021). Meanwhile, project-based learning is a learning model which actively involves students in designing learning objectives to produce real products or projects (Oktadifani, U., Lesmono, A. D., & Subiki, 2017). Hybrid project-based learning is a learning activity which combines face-to-face learning and online learning with students directly designing a project to solve a problem. The previous research indicated that hybrid project-based learning model had a significant effect on the achievement of learning outcomes and creative thinking skills. Hybrid project-based learning is a learning alternative which correlates with the demands of the 21st century (Rahardjanto, 2019). Moreover, it has a positive impact on the development of students' thinking skills (Husamah 2015).

Critical Thinking Skills

Critical thinking is a crucial ability that humans need in almost every activity they carry out. Without this ability, humans will encounter problems in making the decisions they take or encounter more challenges in carrying out the decisions they make. If someone does not think critically in reading, writing, speaking or listening, then that person is not a good reader, writer, speaker or listener as affirmed by Paul in his anthology (Paul, R. & Elder, 2014). The importance of critical thinking skills is re-emphasized for professional life, which is said to be the center of educational reform and adapt to the changing times that are occurring in the 21st century.

Critical thinking does not always mean an activity of criticizing with a negative connotation, but activities of analyzing, interpreting data, evaluating existing evidence, as well as applying knowledge (Diyanni, 2016). John Dewey as the 'father' of critical thinking defines it as thinking process accompanied by active and careful effort which supports knowledge and leads to a conclusion. Because Dewey mentions active effort, it means that a person will inquire himself, seek information on his own, rather than relying on information from others, and prudence means the opposite of unreflective thinking and jumping from one inference to another. Another expert, Glaser, defines critical thinking as a wise way of thinking, carefully considering a problem, which is pursued through

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inquiry and reasoning, so that someone will always test all thoughts/things that people believe. Another well-known expert in this field, Ennis, provides a definition of critical thinking as reasoned, reflective thinking, to be able to decide whether one can trust information or not. Meanwhile, Richard Paul emphasizes the activity of 'thinking about how to think' so that a person can apply thinking methods to help him think critically (Fisher, 2007).

Creative Thinking Skills

Creative thinking has the characteristics of open thinking about new ideas, believing that there will always be alternatives, holding judgment, creating several alternative ways of solving problems, being imaginative, innovative, and divergent thinking (Diyanni, 2016). Creative thinking can occur after critical thinking as a basis for generating new ideas. In other words, critical analysis and evaluation can help generate an idea. On the other hand, ideas can be found without prior critical thinking, but from someone's experience and imagination. Innovative or new ideas can arise in the mind from one's own thinking or from the results of environmental observations which make someone need an innovation. After that, the idea will be analyzed in depth. Without proper analysis, the idea will not be realized or applied firmly.

METHOD

This was a quantitative study using a non-equivalent control group. The treatment was given to the independent variables. The independent variables in this study were the use of a hybrid project-based learning model which were validated by experts through validation sheets. Then, it was determined the effect on the dependent variable, namely increasing students' critical thinking skills and creative thinking skills.

Furthermore, the research used pretest-posttest control group design (Sugiyono, 2013). Prior to the learning process, a pretest was carried out to measure the initial ability of students' critical thinking skills and creative thinking skills, both in the control group and the experimental group. At the time of learning, the control group and the experimental group were given different treatment. The experimental group was given treatment using a hybrid-project based learning model, while the control group was given treatment using a conventional learning model. After that, a posttest was carried out to find out the differences and improvement in students' critical thinking skills and creative thinking skills in each group. The research design for testing the effectiveness of the hybrid project-based learning model can be perceived in Table 1.

Table 1. Research Design

Group	Pretest	Treatment	Posttest
Experiment	O_1	X	O_3
Control	O_2	Y	O_4

The subjects in this study were 60 elementary school teacher education students at Muhammadiyah University of Lamongan. They were divided into two groups, experimental and control groups, in which each class consisted of 30 students. This research was conducted in the Physics Basic Science concept course in the even semester of the 2022/2023 academic year. The data collected in this study were the results of the validity of learning set using the hybrid project-based learning model, the practicality of learning by observing student responses and student activities after carrying out hybrid- project based learning, and the effectiveness of the hybrid project-based learning

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model perceived through the differences and improvement of students' critical thinking skills and creative thinking skills. The variables, data, instruments, and analysis used in this study are presented in Table 2.

Table 2. Variables, Data, Instruments, and Analysis

Variables	Data	Instruments	Analysis
Validity of hybrid project-based learning set	Semester learning plans validation results	Validation sheets	Description of validity criteria
	Learning implementation plans validation results	Validation sheets	Description of validity criteria
	Teaching resources validation results	Validation sheets	Description of validity criteria
	Worksheet validation results	Validation sheets	Description of validity criteria
	Validation results of critical thinking skills test	Validation sheets	Description of validity criteria
	Validation results of creative thinking skills test	Validation sheets	Description of validity criteria
Practicality of hybrid project-based learning set	Students' responses percentage	Students' responses questionnaire	Description of students' responses
The effectiveness of hybrid project based-learning set	The difference in the significant use of hybrid project-based learning set	Concept mastery test	Pretest-Posttest Control Group Design
	An improvement of students' critical and creative thinking skills	Concept mastery test	Description of gain score

RESULTS AND DISCUSSION

Results

The Validity of Hybrid Project-Based Learning Tools

The validity results of the hybrid project-based learning set in the Physics Basic Science Concept course consisted of Semester Learning Plans (RPS), Learning Implementation Plans (RPP), teaching materials, worksheets, critical thinking skills tests, and creative thinking skills tests. Before testing the effectiveness of the hybrid project-based learning model, a validation test was carried out by an expert.

The validity of the hybrid project-based learning set was carried out by two experts who were competent with the material on the Basic Concepts of Natural Science Physics, especially for students

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in tertiary institutions. Data on Table 3 shows the results of the validation of hybrid project-based learning set.

Table 3. Hybrid-project based learning set

No.	Validity	Percentage	Criteria
1	Semester Learning Plans	93%	Very valid
2	Learning Implementation Plans	96%	Very valid
3	Teaching materials	92%	Very valid
4	Worksheets	89%	Very valid
5	Critical thinking skills test	97%	Very valid
6	Creative thinking skills test	95%	Very valid
	Average	**94%**	**Very valid**

Data on Table 3 indicated the validity results of hybrid project-based learning set from the expert. It indicated that the percentage of Semester Learning Plans validity was 93% in the very valid category, Learning Implementation Plan (RPP) was 96% in the very valid category, teaching materials were 92% in the very valid categories, worksheets were 89% in the very valid category, critical thinking skills were 97% in the very valid category, and creative thinking skills were 95% in the very valid category. With the results of this validation, the hybrid project-based learning set can be used properly (Arifin, 2012). Hybrid project-based learning is an innovation of learning model in the 21st century in responding to challenges in the world of education to produce relevant products for students who have a different way of learning compared to previous generations in the previous era (Mustaji, S. M., & Pradana, 2022).

The practicality of hybrid-project based learning set

The practicality of the hybrid project-based learning set can be perceived from the results of student responses in the Basic Science Physics course. The instrument used to obtain student was a questionnaire which was tested on 30 experimental class students and 30 control class students. The results of student responses in the experimental class and control class can be perceived in Table 4 below.

Table 4. The results of the analysis of student responses in the experimental class and control class

No	Criteria	Experimental Class Mean Score	Control Class Mean Score
1	It is more interesting and not boring.	4	3
2	It can create joyful learning environment.	4	3
3	It encourages me to master the materials.	3	3
4	It encourages me to cooperate with my friends in completing the task or assignment in groups.	4	2
5	It encourages me to actively ask to the lecturers about	3	3

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	the materials that I do not understand or the materials that are not clear.		
6	It encourages me to understand the materials well.	4	3
7	It encourages me to obtain maximum learning outcomes.	4	3
8	It is suitable for learning Basic Science Physics.	4	2
	Limited trial results	**30**	**23**
	Percentage of limited trial results	**94%**	**69%**

Based on Table 4, the results of experimental class students' responses indicated a percentage of 94% in the very good category, while the results of control class students' responses indicated a percentage of 69% in the less effective category. Therefore, it can be concluded that the learning process will be more effective and make it easy for students to learn the material using a hybrid-project based learning model.

The Effectiveness of Hybrid Project-Based Learning Set to Improve Critical and Creative Thinking Skills

At this stage, the researchers tested the effectiveness of the hybrid-project based learning model in improving students' critical thinking skills and creative thinking skills. The test was carried out through a pretest-posttest control group design. The hypothesis being tested was students' critical thinking skills and creative thinking skills improved after the implementation of a hybrid project-based learning model compared to using only conventional learning model. Before the hypothesis was tested, the data were tested for homogeneity and normality, and the results showed that the data were homogeneous and normally distributed. The results of the t-test analysis of critical thinking skills can be perceived in Table 5.

Table 5. Critical thinking skills t-test results

	Pretest		Sig.	Posttest		Sig.
	Experiment Class	Control Class		Experiment Class	Control Class	
Highest score	77	84		92	89	
Lowest score	56	55		80	67	
Mean	68.68	67.50		84.93	77.29	
Standard Deviation	6.074	7.290		3.589	4.875	
t-test score	**3.657**		**0.034**	**6.680**		**0.023**

Data on Table 5 indicated that in the pretest there was no significant difference between the mean value of the control class and the experimental class. In the pretest, the mean scores of the experimental class and the control class were 68.68 and 67.50, respectively. However, in the posttest there was a significant difference between the mean scores of the experimental class and the control class. The mean scores of the experimental class and the control class were respectively 84.93 and 77.29 with a sig. 2 tailed of 0.029 <0.05, so H0 was rejected and H1 was accepted. Thus, it can be interpreted that there was a significant difference in critical thinking skills between students who used the hybrid project-based learning model and conventional learning model. To obtain how effective the

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hybrid project-based learning in improving critical thinking skills, the researchers measured it using the N-gain score test. The N-gain score was calculated based on the difference in the mean scores of pretest and posttest. Table 6 below shows the results of the N-Gain test scores of students' critical thinking skills.

Table 6. The N-Gain scores of critical thinking skills

	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain Score	60	.25	1.00	.7620	.23522
N-Gain Percent	60	25.00	100.00	76.2032	23.52174
Valid N (listwise)	**60**				

Based on Table 6, the results of the N-Gain test showed that the mean score of students' critical thinking skills was 76.20% which was included in the effective category. Based on these results, it can be concluded that learning using a hybrid project-based learning model was able to improve students' critical thinking skills. On the other hand, the results of the t-test analysis of creative thinking skills can be perceived in Table 7.

Table 7. The t-test results of creative thinking skills

	Pretest		Sig.	Posttest		Sig.
	Experiment Class	Control Class		Experiment Class	Control Class	
Highest score	76	85		90	92	
Lowest score	55	50		80	82	
Mean	67.66	67.50		83.22	78.04	
Standard Deviation	6.055	7.920		3.985	4.875	
t-test score	**3.576**		**0.015**	**6.860**		**0.019**

Data on Table 7 showed that in the pretest there was no significant difference between the mean scores of the control class and the experimental class. The mean scores for the experimental class and the control class were 67.66 and 67.50, respectively. However, in the posttest there was a significant difference between the mean scores of the experimental class and the control class. The mean scores of the experimental class and the control class were respectively 83.22 and 78.04 with a sig. 2 tailed of 0.019 <0.05, so H0 was rejected and H1 was accepted. Thus, it can be interpreted that there was a significant difference in creative thinking skills between students who used the hybrid project-based learning model and conventional learning model. To obtain how effective the hybrid-project based learning model in improving the creative thinking skills, the researcher measured it using the N-gain score. The N-gain score was calculated based on the difference in the mean scores of pretest and posttest. Table 8 below shows the results of the N-Gain test scores for students' creative thinking skills.

Table 8. The results of creative thinking skills N-Gain score

	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain Score	60	0.35	9.8	0.750	0.2421
N-Gain Percent	60	39.00	98.00	77.115	20.163
Valid N (listwise)	**60**				

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Data on Table 8 indicated that the mean scores of students' creative thinking skills was 77.11% in the effective category. Based on these results, it can be concluded that learning using hybrid project-based learning was able to improve students' creative thinking skills.

Discussion

The hybrid project-based learning model is a learning activity which combines face-to-face learning and online learning with students directly designing a project to solve a problem (Nurdiansah, I., & Makiyah, 2021; Mustaji, S. M., & Pradana, 2022). HPjBL has a significant effect on the achievement of learning outcomes and creative thinking skills which are in line with the demands of the 21st century (Husamah, 2015; MZ, A. S. A., Rusijono, R., & Suryanti, 2021). The hybrid project-based learning model is a learning alternative which is in accordance with current conditions because students can learn independently based on instructions presented systematically. Students are also directly invited to make a project related to simple practicum by carrying out their activities independently and creatively. Through this model, students can explore tools and materials which are easy to find in their everyday life (Trisnowati, 2022; MZ, A. S. A., Aprillya, M. R., & Bianto, 2022). Thus, students can discover a physics concept by observing, classifying, interpreting, predicting, asking questions, formulating hypotheses, planning simple experiments, using tools and materials, applying concepts, communicating, and carrying out experiments independently. They can improve critical and creative thinking skills in physics learning. In the context of physics, critical thinking skills and creative thinking skills are skills to obtain physics products through scientific procedures (Irmaningrum, R. N., Zativalen, O., & MZ, 2023).

From the results of the validation test, hybrid project-based learning set is valid to use. After testing the validity of the Semester Learning Plan (RPS), Learning Implementation Plan (RPP), teaching materials, worksheets, critical thinking skills test, and creative thinking skills test it can be said that the hybrid project-based learning set is very valid to use as a learning model for the Basic Science Physics course at Muhammadiyah University of Lamongan (Trimawati, K., Kirana, T., & Raharjo 2020; Kharisma et al., 2023). The results of the students' responses questionnaire analysis showed that the percentage of students' responses in the experimental class was 94% in the very effective category, while the results of the control class students' response questionnaire in the control class was 69% in the less effective category. It can be concluded that the learning process will be more effective and make it easier for students to study the Basic Science Physics course by using hybrid project-based learning as a learning model.

The effectiveness of hybrid project-based learning model in improving students' critical thinking skills and creative thinking skills is very possible, as evidenced by the results of the t-test which states that there is a significant difference in the results of the t-test of critical thinking skills 0.023 <0.05. Moreover, the results of the N-Gain test state that there is an increase in students' critical thinking skills after using the hybrid project-based learning model with a percentage of 76.20% in the effective category. The results of the t-test state that there is a significant difference in the results of the t-test for creative thinking skills of 0.019 <0.05. The results of the N-Gain test stated that there is an increase in students' creative thinking skills after using the hybrid project-based learning model with a percentage of 77.11% in the effective category. The learning process with project-based learning had an effect on increasing students' learning motivation (Zikri, A., Darvina, Y., & Sari, 2020)

In addition, creativity, critical thinking, and students' cognitive abilities increase compared to conventional learning. Thinking is reasonable when thinkers attempt to analyze opinions carefully, look for valid evidence, and reach reasonable conclusions. The goal of teaching students to think

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critically is to develop students who think fairly, objectively, and are committed to clarity and accuracy. Creative thinking is like critical thinking. Creativity is the ability to form new combinations of ideas when meeting needs. Creative process embodies continuous communication between integration and effusion, convergence and divergence, thesis and antithesis, which can be done by combining critical thinking ideas.

These results are in line with several previous findings which state that the hybrid project-based learning model is proven to be effective in improving critical thinking skills and creative thinking skills (Mustaji, S. M., & Pradana, 2022; Trimawati, K., Kirana, T., & Raharjo, 2020). Then, in the context of science, the hybrid project-based learning model is also proven to be able to facilitate students' learning. HPjBL provides many benefits for students and educators. Academic research is increasingly supporting the use of HPjBL to engage students, reduce absenteeism, improve collaborative learning skills, and improve academic achievement (Dewi, 2020). In addition, HPjBL benefits students in the following ways: (1) increased attendance, increased independence, and a more positive attitude toward learning; (2) academic benefits are comparable to or higher than those produced by alternative models, with students engaged in projects taking greater ownership of their learning than they do during more traditional classroom activities (Boaler, 1997); (3) opportunities for the development of advanced skills such as critical thinking, problem solving, collaboration, and communication; (4) increased access to wider educational opportunities in the classroom, as well as strategies to engage culturally diverse students (Railsback, 2002). HPjBL positively influences student learning and grades as it increases students' critical thinking and problem-solving abilities, increases opportunities for peer-to-peer discussion during group HPjBL activities, and increases students' interest and motivation to learn through the practical application of techniques (Magnus et al., 2020). HPjBL is very supportive in learning activities, because it can increase good learning motivation for students and can change students' learning character. Based on research findings and literature from various sources, it can be concluded that HPjBL is effective in increasing critical thinking skills and creative thinking skills.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of data analysis and discussion of research results, it can be concluded that 1) HPjBL learning set is appropriate to improve learning outcomes. HPjBL can help improve educational outcomes. The result was obtained by comparing the posttest scores of the control and experimental groups, which revealed that learning with the HPjBL produced significantly better results than conventional learning. The HPjBL is a type of blended learning which can be used with other courses with share similar characteristics. Monotonous classical learning also hinders students' critical and creative thinking patterns. By designing an assessment instrument for the Basic Science Physics Concepts in HPjBL, it can motivate students to respond to good learning and improve students' critical and creative thinking. Thus, it can be used as an alternative to implementing integrative learning and to train student activities in collaborating, communicating, and creating a work, product, or an innovation to face the challenges of the 21st century. An assessment instrument containing the formulation of questions which are in accordance with the Basic Concepts of Natural Science Physics in HPjBL requires the implementation of time-efficient learning to improve students' ability to think critically and think creatively significantly. In this model, future learning interactions are suggested to be combined with synchronous interactions to create real-time interactions, a new concept in the online learning model.

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