



Hybrid-PjBL: Learning Outcomes, Creative Thinking Skills, and Learning Motivation of Preservice Teacher

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Hybrid-PjBL is an innovative learning model relevant to the demands of the twenty-first century scheme. The study on Hybrid-PjBL is still rarely conducted by Indonesian researchers and the studies are still limited to the effect of this model on student's thinking skills and metacognitive awareness. Thus, this study aims to examine the effect of Hybrid-PjBL implementation on learning outcomes, creative thinking skills, and student's learning motivation. This study used quasi-experiment, through Nonrandomized Control Group Pretest-Posttest Design. The population was all the sixth-semester students in the Biology Education Department, University of Muhammadiyah Malang. The study sample involved two classes randomly selected from a total of three classes at this institution, comprising students who took Environmental Knowledge course; each class consisted of fifty students. Learning outcomes test sheets, creative thinking skill notes, and motivation questionnaires were instruments used to collect the data. The data obtained were then analyzed using one-way analysis of covariance with the significance level of 5%. The results showed that the application of Hybrid-PjBL had a significant influence on the achievement of learning outcomes and creative thinking skills. The results of this study indicate that Hybrid-PjBL is an alternative learning, suitable to the demands of the twenty-first century.

Keywords: creative thinking, hybrid learning, learning outcomes, PjBl, preservice teacher

INTRODUCTION

Since the development of technology and information has penetrated the education, teachers and lecturers design more innovative learning (López-Pérez, Pérez-López, &

Citation: Rahardjanto, A., Husamah, & Fauzi, A. (2019). Hybrid-PjBL: Learning Outcomes, Creative Thinking Skills, and Learning Motivation of Preservice Teacher. *International Journal of Instruction*, 12(2), 179-192. <https://doi.org/10.29333/iji.2019.12212a>

Rodríguez-Ariza, 2011). One breakthrough in the use of technology in the world of education is the implementation of hybrid learning (Kaur, 2013), or also known as the term blended learning (Husamah, 2015b, 2015a). This is to combine the process of delivering learning content via online, offline, mobile, with a face-to-face learning and has been applied to various levels of education (Kaur, 2013; Napier, Dekhane, & Smith, 2011). Driven by numerous obtained benefits, the implementation of hybrid learning has a significant increase in education settings. However, although various studies have reported the superiority of hybrid learning, a teacher has to be able to determine a suitable design to achieve the projected learning outcomes.

A good and an effective learning process will assist students (prospective teachers) to achieve the competencies that have been formulated in learning goals optimally (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). Lecturers may determine the form of learning that will be used as a means of achieving the learning objectives as well as making learning more effective (Kudryashova, Gorbatov, Rybushkina, & Ivanova, 2016). The achievement of learning objectives and the effectiveness of learning process is reflected in the score of learning outcomes obtained by students. Selection of the right learning model will facilitate students to obtain optimal learning outcomes (Masino & Niño-Zarazúa, 2016). Conversely, if the learning does not apply the right learning model, student's learning outcomes become less optimal.

However, the quality learning is not only determined on the basis of how well the learning outcomes achieved by students (Christou, 2016; Fauzi, 2013; Trilling & Fadel, 2009). Learning is also said to be high quality if learning is capable to facilitate students to prepare themselves as individuals who are able to compete in employment after graduation (Mcfarlane, 2013; Trilling & Fadel, 2009). Individuals who are able to compete are those who master a variety of life skills and thinking skills (Buku, Mite, Fauzi, Widiansyah, & Anugerah, 2015; Jerome, Lee, & Ting, 2017; Magsino, 2014; Wilson, 2016). Therefore, the learning process are expected to be able to improve various student thinking skills (Genlott & Grönlund, 2013; Prasertcharoensuk, Somprach, & Ngang, 2015).

Creative thinking skill is highly demanded in this current era (Ersoy & Baser, 2014; Larson & Miller, 2011; Lee & Carpenter, 2015; Ritter & Mostert, 2016; Silva, 2009; Tofade, Elsner, & Haines, 2013). Through creative thinking skills, students will be able to modify, reuse, or even create new ideas or products. They are also able to digest the information they get from different perspectives (Özdas & Batdi, 2017). Students with well-trained creative thinking skills will be able to be flexible and see opportunities as well as to face challenges in a world that is continuously developing rapidly (Ritter & Mostert, 2016). Considering the importance of thinking skills, the process of education and learning is expected to be able to boost students to be creative thinking individuals (Gregory, Hardiman, Yarmolinskaya, Rinne, & Limb, 2013; Y.-S. Lin, 2011; Özdas & Batdi, 2017; Shaheen, 2010; Thompson, 2017). Therefore, lecturers as the main component, who most often interact with students, are expected to be able to select learning that empowers students' creative thinking skills optimally (Nagappan, 2010).

In addition to students' optimal achievement level of learning outcomes and creative thinking skills, the learning process is said to be performed well if it is also able to motivate students to actively participate in learning. With the motivation to learn, students will be increasingly interested in being involved in the learning process (Ambrosi-randi & Ruži, 2010; Vero & Puka, 2017; Wood, Rowell, & Hong, 2013). A student with high learning motivation tends to achieve learning success (Flitcroft & Woods, 2018; Wood et al., 2013). In fact, some researchers claim that motivation acts as one of the main keys to one's academic success (Hoffman, 2009; Joibari & Mohammadtaheri, 2011; Mohzan, Hassan, & Halil, 2013; Sogunro, 2014). In addition, learning motivation has also been reported to have a positive correlation with several parameters, one of which is learning outcomes (Alhadi & Saputra, 2017; Everaert, Opdecam, & Maussen, 2017; Hoferichter, Raufelder, & Eid, 2015).

One of the learning models suitable for the 21st Century competencies is Project-based Learning or PjBL (Bell, 2010). Through PjBL, students will be directed to join the learning process actively and independently as well as to train them to collaborate and communicate with peers (Kokotsaki, Menzies, & Wiggins, 2016). PjBL is also considered as a form of learning that is fitted for students in the science field of study (Crippen et al., 2016; Movahedzadeh, Patwell, Rieker, & Gonzalez, 2012). This learning has also been reported to have a positive impact on learning outcomes (Fini, Awadallah, Parast, & Abu-Lebdeh, 2018), creative thinking skills (Antika & Nawawi, 2017; Rambely et al., 2013), as well as the increase of student's learning motivation (Movahedzadeh et al., 2012).

Various studies have been carried out to examine the impacts of PjBL. However, modification of learning activities in PjBL was rarely conducted. Some other studies have tried to integrate PjBL with other learning models, such as the PjBL-Student Team Achievement Divisions (Husamah & Pantiwati, 2014). Based on the current trend of hybrid learning, studies on the integrated PjBL to hybrid design are still rarely found; one of which was carried out by Husamah (2015a). In the study, Hybrid-PjBL could stimulate and develop students' metacognitive awareness effectively. Subsequent studies conducted by Husamah (2015b) reported that the use of Hybrid-PjBL had a positive impact on students' thinking skills development.

The benefit evaluation of Hybrid-PjBL implementation in the learning process still needs to be reviewed in order to determine the effect of this form of learning on various other parameters. Previous reports only examine the effect of Hybrid-PjBL on students' thinking skills and metacognitive awareness. Concept mastery which is a general parameter that correlates with the quality of learning has never been analyzed in this learning model. Moreover, the empowerment of creative thinking skills which is also an indicator of the quality of 21st-Century learning has never been conducted. The changes in students' motivation participating in Hybrid-PjBL have also never been studied. Therefore, in this study, the effect of Hybrid-PjBL implementation on those parameters will be assessed. In more detail, the main problems of this study were to examine the effect of Hybrid-PjBL application on cognitive learning outcomes, creative thinking skills, and student's learning motivation.

METHOD

This study used quasi-experimental through Nonrandomized Control Group Pretest-Posttest Design which aims to determine whether the application of Hybrid-PjBL has a significant effect on students' learning outcomes, creative thinking skills, and learning motivation or not. The research was conducted in the even semester, 2017/2018 academic year, from February to July, 2018 in Malang City. There were three dependent variables, namely learning outcomes, creative thinking skills, and learning motivation. On the other hand, the independent variable of this study was the learning model. The study population was all sixth semester students in the Biology Education Study Program, University of Muhammadiyah Malang, in total 150 people. The samples of the study were students of B (control class) and C classes (experimental class) who took the course on Environmental Knowledge; each class consisted of fifty students. In the control class, students took lessons in the form of lectures, class discussions, and individual tasks, while in the experimental class students followed learning through the Hybrid-PjBL model. In the experimental class, students met face to face as many as nine times and online learning, equivalent to five meetings. The study was conducted when the research subjects in both classes received topic "Impact of Human Activities on the Environment and Efforts to Overcome It". On the sub topic "Efforts to Overcome Environmental Problems", students who received Hybrid-PjBL learning would carry out project activities with the theme "Making Various Innovative Products from Plastic Waste Material" while students in the control class did not carry out the project activities.

Data collection in each parameter under the study was done twice, before (pretest) and after (posttest) the introduction of the independent variables in both classes. Instruments used in the process of data retrieval of learning outcomes were learning outcomes test sheets. This instrument consists of ten essay questions. The instrument has been tested at the University of Muhammadiyah Malang involving 60 students as respondents. Based on the results of the instrument item analysis, it could be concluded that the ten items were declared valid and the instruments included in the "reliable" category.

Data on creative thinking skills were collected using creative thinking skills test sheets developed by Marzano (2001). This test consists of 13 items and each item was composed of three categories, i.e. low (1.00 – 2.00), moderate (2.01 – 3.00), and high (3.01 – 4.00). Based on instrument item analysis, all items were valid and the instruments were reliable. Then, the data on learning motivation were collected using motivation questionnaires using ARCS model (Attention, Relevance, Confident, and Satisfaction) developed by Keller (1984, 1987). This questionnaire consists of 22 statements. The scale used in this questionnaire is a Likert type scale consisting of items with the degrees of 1) strongly disagree; 2) disagree; 3) agree; and 4) strongly agree.

The results were analyzed using ANCOVA test. Before conducting the ANCOVA test, the research data were tested for normality and homogeneity using the Shapiro-Wilk and Levene tests. If the data did not meet the assumption of normality or homogeneity, then the data analysis would be transferred using the Quade's Rank Analysis of Covariance

test. Data analysis was carried out using IBM Statistics 24 software with a significance level of 5%.

FINDINGS

The level of student's concept mastery and competencies can be measured through learning outcomes tests. The optimal achievement of those parameters can be influenced by the learning model implemented in their class. The results of the Shapiro-Wilk and Levene's test analysis of those data obtained in this study are presented in Table 1. Based on Table 1, the Sig. of learning outcomes, creative thinking skills, and learning motivation from the Shapiro-Wilk test are 0.809; 0.062; and 0.179, respectively; whereas from Levene's test are 0.907; 0.102; and 0.796, respectively. Therefore, all of data obtained from this study have met the assumptions of normality and homogeneity requirement.

Table 1

The Results of the Normality and Homogeneity Tests of the Research Data

Data	Statistical Tests	Sig.
Learning outcomes	Shapiro-Wilk	0.809
	Levene	0.907
Creative thinking skills	Shapiro-Wilk	0.062
	Levene	0.102
Learning motivation	Shapiro-Wilk	0.179
	Levene	0.796

Achievement of learning outcomes is one of the parameters of learning success. Based on the hypothesis test results presented in Table 2, the F value was 39.586 with Sig. < 0.05. Thus, there was a significant difference in the achievement of student learning outcomes in the experimental class with the control class. The mean scores of corrected results presented in Table 3 projected that students in the experimental class had better learning outcomes compared to the control class ($86.523 > 73.028$). This information indicates that students who receive Hybrid-PjBL learning have a significantly higher level of learning outcomes than the students in other classes.

Table 2

The Results of the ANCOVA Test of the Research Data

Data	Degree of Freedom	F	Sig.
Learning outcomes	1	39.586	< 0.05
Creative thinking skills	1	11.505	< 0.05
Learning motivation	1	3.483	0.06

Table 3

The Comparison of Mean Scores of Corrected Results from Experimental and Control Classes

Data	Classes	Pretest	Posttest	Increase (%)	Corrected Mean Scores
Learning outcomes	Experiment	53.763	85.421	58.884	86.523
	Control	60.075	74.075	23.304	73.028
Creative thinking skills	Experiment	67.921	83.974	23.635	80.387
	Control	58.300	69.225	18.739	72.633
Learning motivation	Experiment	27.816	34.947	25.636	34.378
	Control	26.275	31.900	21.408	32.441

These study results that pinpoint the influence of the application of Hybrid PjBL learning on student's learning outcomes are in line with several previous reports examining almost identical learning designs. Some reports, such as Fini et al. (2018), Hamoush, Fini, Parast, and Sarin (2011) and Zouganeli, Tyssø, Feng, Arnesen, and Kapetanovic (2014) argue that the implementation of PjBL has a positive impact on student's learning outcomes. Furthermore, Berns, Luis, Montes, Duarte, and Dodero (2016) and Kiviniemi (2014) suggest that hybrid learning is able to facilitate students to maximally obtain meaningful learning for better outcomes.

In this study, learning outcomes describe students' concepts mastery. Students in experiment class had better concepts mastery since Hybrid-PjBL was able to facilitate meaningful learning. In the experimental class, such learning conditions were realized by project activities carried out by students. The project aims to solve environmental pollution problems around them. Therefore, the learning activities facilitate in experimental class students to gain meaningful learning experience through problem-solving activities that are associated with real conditions occurring in everyday life. This activity is actually the main characteristic in the PjBL learning model (Bell, 2010; Kokotsaki et al., 2016).

Besides being facilitated to get meaningful learning, students in the experimental class were also facilitated to become active learners. During project activities, they were encouraged to actively reflect their knowledge and have the awareness to collaborate in groups. Collaborative activities in solving problems through project activities are known to be able to educate students to become active learners (Amin & Adiansyah, 2018; Antika & Nawawi, 2017; Bell, 2010; Kokotsaki et al., 2016; Ramdiah, Abidinsyah, & Mayasari, 2018). This collaboration activity was also reportedly capable to optimize the process of absorbing knowledge during learning (Krishnan, Gabb, & Vale, 2011; L. Lin, 2015; Taniguchi, Gao, Kojima, & Konomi, 2018).

The next parameter in this study is creative thinking skills. Based on the results of hypothesis testing using ANCOVA (Table 2), the F value obtained on creative thinking skills variable was 11.505 with Sig. < 0.05. Thus, the achievement of creative thinking skills of students who received Hybrid-PjBL learning was significantly different from students who did not receive the learning. Furthermore, based on the results of data analysis presented in Table 3, it can be seen that the average corrected scores of students' creative thinking skills in the experimental class (80.387) was higher than the

control class (72.633). Thus, based on the ANCOVA test results and average corrected scores, the achievement of creative thinking skills of students who received Hybrid-PjBL learning was significantly higher than students who did not receive the learning.

The influence of Hybrid-PjBL implementation on students' creative thinking skills is in line with several previous reports that examine the use of PjBL and hybrid learning to thinking skills. Antika & Nawawi (2017) and Rambely et al. (2013) emphasize that PjBL is able to empower students' creative thinking skills. In line with these findings, Husamah (2015b) also suggests that Hybrid-PjBL is a learning that has the potential to better develop students' thinking skills. Further studies state that Hybrid-PjBL has the potential to stimulate three components of thinking skills, namely self-regulation, critical thinking skills, and creative thinking skills.

Similar to the learning outcomes parameters, one reason why students' creative thinking skills in the experimental class were better than the control class was that students in the experimental class carried out project activities. Through those activities, they were encouraged to use their creativity in solving environmental pollution problems. The students in the experimental class were required to utilize their knowledge and skills to be able to produce unique and creative products. This explanation is in line with Isabekov & Sadyrova (2018) who informed that the application of project activities in learning is an innovative breakthrough that can transform the learning process into a means of developing students' creativity. In addition, a similar explanation was also given by Movahedzadeh et al. (2012) who stated that project activities require students to solve problems by producing a product creatively.

The third parameter is learning motivation. Based on Table 2, the F value obtained from the ANCOVA test on the learning motivation variable was 3.483 with Sig. 0.066 > α . Thus, the learning motivation of students who received the treatment with Hybrid-PjBL learning was not significantly different from students who did not receive the learning. Therefore, although the average corrected student learning motivation in the experimental class (34.378) was greater than the control class (32.441) (Table 3), the learning motivation of students who received Hybrid-PjBL learning could not be said to be significantly better than students who did not receive the learning. Although there was no significant difference, in line with the average corrected scores, the increase in student's motivation in the experimental class (25.636%) was also higher than the control class (21.408%). This finding indicates that there is a potential for Hybrid-PjBL to improve student's learning motivation.

The lack of significant differences between students in the experimental class and the control class in this study are possibly caused by study duration factor. The reason, sometimes, some studies have not been able to show a significant effect of a treatment on the measured parameters if the duration is too short. Therefore, to optimize the effects of treatment, several quasi-experimental researchers conduct their studies in a long period of treatment. Some studies, such as Fauzi (2013); Ramadani et al. (2015); and Sukmawati et al. (2015), give a treatment for one semester. Therefore, the tendency of research results from this present study shows that student's learning motivation in the

experimental class which was better than the control class is likely to change significantly if the research is conducted in a longer period of time.

The possibility of a significant influence on the application of Hybrid-PjBL is based on several reasons. First, some previous studies informed that PjBL and hybrid learning are the suggested forms of learning that have been able to increase student's learning motivation (Chiang & Lee, 2016; López-Pérez et al., 2011; Movahedzadeh et al., 2012). Second, several previous studies have also reported a correlation between motivation and some parameters of student's learning success (Alhadi & Saputra, 2017; Everaert et al., 2017; Taurina, 2015; Widiensyah, Indriwati, Munzil, & Fauzi, 2018). One parameter that correlates with motivation is learning outcomes. Students who have good learning outcomes tend to have high learning motivation. Third, some of the learning experiences in Hybrid-PjBL are likely to increase student learning motivation.

Related to learning experiences, students who received PjBL in the experimental class did some activities that were able to increase their learning interest. The first activity was the activity of solving environmental problems through project activities. During the study, students in the experimental class carried out those activities. This explanation is in line with Movahedzadeh et al. (2012) who conveyed project activities which are believed to be able to increase the engagement of students on learning process. Furthermore, students in experimental class followed online learning. According to several references and some previous studies, interactive learning activities offered on online learning design are considered capable of making a pleasant learning climate and increasing learning motivation and student involvement in the learning process (Afip, 2014; Shea, Joaquin, & Gorzycki, 2015; Vaughan, 2014).

CONCLUSION

In this study, the effect of Hybrid-PjBL on learning outcomes, creative thinking skills, and increased learning motivation was studied at higher education level. The results of this study indicate that there were significant differences between students who were taught using PjBL learning and the counterparts by conventional learning, both on the parameters of learning outcomes and creative thinking skills. Furthermore, although it did not have any significant difference with the control class, Hybrid-PjBL has had the potential to increase student's learning motivation. The results of this study suggest that Hybrid-PjBL is an alternative form of learning relevant to the demands of the 21st Century. Assessment of the implementation of Hybrid-PjBL on other parameters needs to be developed in future studies to uncover the positive impact of the model more thoroughly. The addition of study duration is also recommended so that the long-term impact of Hybrid-PjBL can be analyzed.

ACKNOWLEDGEMENT

The authors would like to say thank you to Rector of Universitas Muhammadiyah Malang and the Dean of Faculty of Teacher Training and Education for support in this research (facilities and funding).

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