The Effectiveness of PBL Collaborated with PjBL on Students' 4C in the Course of Basic Education

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Competencies that have to be owned in 21st century in order to survive and compete globally are Creative thinking, Critical thinking and problem solving, Collaboration, and Communication (4C). This study aims to analyse the effectiveness of PBL (Problem Based Learning) collaborated with PjBL (Project Based Learning) on students' 4C (four competencies). The population of study are all first semester students in 7 classes who take the course of basic education at of Muria Kudus University. Samples are 4 classes with total of 126 students. It is chosen using stratified random sampling method. This study implements quantitative research with one group pre-test post-test design. The results of study show that in the teaching and learning process the score of lecture's activity is 0,915 with excellent category. Students' critical thinking and problem solving achieve average score of N-Gain is 0,587 with adequate category. Students' creativity and innovation get score of 0,809. Students' collaboration competence gets score of 0,816. Their communication competence gets score of 0,825. All of these competencies belong to excellent category. It can be concluded that PBL collaborated with PjBL is effective for students' 4C (four competencies).

Keywords: problem based learning, project based learning, 4C, basic education, learning

INTRODUCTION

The 21st century challenges require students to master several competencies in order to be able to survive and compete globally. Triana et al. (2021) state that those competencies are critical thinking and problem solving, creativity and innovation, collaboration, and communication (4C). Students are supposed to be able to think critically in solving problems using creativity and innovation. With collaboration, the

work can be more effective and efficient. The effective communication causes no misunderstanding with others. Thunkam (2016) says that 21ˢᵗ century competency is as ways to thinking (knowledge, critical and creative thinking), ways to learning (literacy and soft skills), and ways to learning with other (personal, social, and civic responsibilities).

The US-based Partnership for 21st Century Skills (P21) has identified the critical thinking skill, creative thinking skill, communication skill, and collaboration skill as the competencies required in the 21ˢᵗ century. Those competencies are known as 4C (Darmuki et al., 2022). Facione (2013) states that critical thinking is as self-regulation in making decision which results in interpretation, analysis, evaluation, inference, and presentation using evidences, concepts, methodology, criteria, or contextual consideration. Creative thinking skill is a skill related to the ability in applying new approach to solve problem and create innovation. It is a completely new and original action either individually or culturally (Bell, 2010). Students' willingness to think about problems, share it with others, and listen to feedback is the example of creative thinking skill. The communication skill is an ability to deliver thought, ideas, knowledge, or new information written or orally (The Partnership for 21st Century Learning, 2015). It includes listening, writing, and speaking skills (Darmuki et. al., 2018; Darmuki et. al., 2017). The collaboration skill is an ability to cooperate effectively and efficient, show respect to various teams, practice willingness to make decisions (Arifin, 2017). It includes ability in group working, leading, deciding, and cooperating (Darmuki & Hidayati, 2019; Darmuki, et. al., 2023).

Many studies related to the learning model of constructive, critical, creativity, and collaborative (4C) had been conducted. Saputra et al. (2019) had conducted study about the integration of scientific method and collaborative-critical thinking in the debate class which revealed that it was able to improve students' debate skill. A study by Persky (2019) developed collaborative-critical thinking to improve students' social skill based on cooperative learning. Arifin (2017) conducted a research about the assessment of creative test and critical thinking in the classroom learning. Moreover, Liu et al. (2018) conducted a study on the implementation of creative and critical thinking in Singapore schools that showed a good mastery in its implementation. A study conducted by Kleinig (2018) was related to the critical thinking as one of attributes to be success in 21ˢᵗ century. Furthermore, Hohmann & Grillo (2014) conducted a research on the important of collaboration learning and critical thinking skill which provided better results rather than Group Investigation and Jigsaw. Most studies were commonly not maximum and specific on the course of basic education which was focussed on 4C learning model.

Problem Based Learning (PBL) Collaborated with Project Based Learning (PjBL)

The PBL collaborated with PjBL has a characteristics in which knowledge is constructed by students from their problem. They are active to cooperate in collaborative groups to find solutions of the problems using projects. The constructivism and collaborative (socio-cultural) views emphasize on the important of students' activeness to have autonomous learning. The integration of these views states that

knowledge is constructed from the individual process to be active and cultural adjustment through social interactions and projects. Therefore, PBL collaborated with PjBL is created. The constructivism-collaborative learning includes initial conceptions (schemata), assimilation, accommodation, cognitive imbalance, Proximal Development Zone, and scaffolding (Supena et al., 2021).

PBL collaborated with PjBL requires students to learn each other through discussion and dialogue so it can improve their critical and creative thinking to solve problems. It can also improve their mastering skill. The discussion and dialogues activities in this learning model are potentially to minimize the gap between students who have low and high academic skills. This learning model also requires lecturer to make class as a learning community. In the classroom, students are not only learn about facts, they are also train their inquiry skill such as delivering opinions, describing solutions, predicting alternative ways, and controlling natural events. Ideal learning community supports students to learn using various learning sources such as textbooks, their surroundings, and communication results with their peers and lecturers. Multidirectional interaction in this learning model has to be created by lecturer.

The stages of PBL collaborated with PjBL are: 1) students are oriented to problems by setting the project theme, 2) students are organized to learn the context of material, 3) designing activities and facilitating individual or group investigations, 4) developing, processing, and presenting the learning activities, 5) analysing and evaluating the process of problem solving to complete the project.

Theoretical Review

Afifah, et. al. (2019) argue that problem based learning is a learning model that involves students to solve problem in which the opening presents real problems for students; they solve it using problem solving approach (Palupi, et. al., 2020). Arends (2018) states that the syntax of problem based learning is started from (1) providing orientation to the students' problems, (2) organizing students to study it, (3) facilitating them to study it in groups or individually, (4) developing and presenting the results, (5) analysing and evaluating the process of solving the problems. The learning model that is appropriate with Curriculum 2013 is problem solving. According to Gunawan, et. al. (2019), Utami & Giarti (2020), Muskita, et. al. (2020), Santyasa, et. al. (2020) Woolfolk in Ju & Choi (2018) explain that this learning model is students' skill in utilizing their critical thinking to solve problems through compiling facts or finding data, analysing information, compiling alternative solutions. Moreover, Ojaleye & Awofala (2018) states that the syntax of problem solving learning is started from: (a) identifying problems, (b) representing problems, (c) planning the solutions, (d) implementing the solutions, (e) assessing from planning, (f) assessing from results. Based on those opinions, it can be stated that problem based learning (PBL) is a student-centred learning approach which is conducted by directing students to be autonomous learners are involved in group discussion actively.

Fatmawati & Sujadmika (2018) explains that critical thinking skill consists of several activities, namely formulating problems, planning strategies, and formulating conclusion

(Tapung, et. al., 2018). According to Triana, et. al. (2020), skills related to the critical thinking concepts are the abilities to understand problem, select important information to solve problems, understand assumptions, formulate and select relevant hypothesis, draw valid conclusions, and determine the validity of it (Prayoga & Setyanigtyas, 2021). Perdana, et. al. (2020) find that the analogy and relationships between the information determine the validity of it to solve problems and evaluate it. Experts' opinions are different. However, they have similarity in the aspects of collecting, evaluating, and utilizing information effectively. Critical thinking ability is needed by students, so they are not wrong in making decision (Muskita, et. al., 2020; Wedekaningsih, et. al., 2019; Prasasti, et. al., 2019).

Kleinig (2018) says specifically that critical thinking skill includes: 1) observation, 2) curiosity, raising relevant questions and finding needed sources, 3) test the assumptions using facts, 4) recognize the problems, 5) assess the validity of arguments or statements, 6) make wise conclusions and valid solutions, and 7) understand logical arguments.

Critical thinking is started from responding to problems and finding solutions, so the focus of problems can be viewed from the arguments provided. Students can deliver responses in forms of logical reasons. When it is appropriate, the conclusions can be drawn. There must be clarity of terms, so there is no mistake in making conclusion. They have to check and re-check it again.

Critical thinking skill can be tested using indicators taken from Persky, et. al. (2019), namely providing assumptions, making inference, giving deductions, interpreting, and evaluating arguments. It is supported by Liu et al. (2018) who state that constructs of critical thinking are as follows: 1) formulating problems that can be measured by students' skill in formulating questions to investigate, 2) providing arguments that can be measured by formulating it based on the needs and being able to show the differences and similarities of various aspects from the task given, 3) doing deduction that can be measured by students' skills to make logical deductions and interpret data appropriately, 4) doing induction that can be measured by students' skill to analyse data, make generalization, and draw proper conclusion, 5) evaluating that can be measured by students' skill to evaluate based on facts, 6) deciding and taking actions that can be measured by students' skill to determine ways and alternative solutions.

The term creativity is defined as the implementation of new ideas to achieve effective teaching (Khodabakhshzadeh, et. al., 2018). Creative thinking has a deep relationship with problem solving competence. The one who has creative thinking is not only able to solve various problems; he is also able to find solutions of the problems. Creative thinking competence is an important part to solve problem. In line with Lee (2018), a positive thinking on solving problem can improve the success in it. Creative thinking can enhance positive attitude, so a person never gets up in despair. Therefore, creative thinking is very important in problem solving.

Communication competence is someone's knowledge in conducting verbal and nonverbal communication using media to ask questions, interact, and collaborate with others (Eggen, 2018). According to Stoner (2018), communication is an attempt to provide understanding to obtain other's feedback or response. Based on those opinions,

it can be concluded that communication is delivering information, ideas, emotions, and skills written or orally.

Collaboration competence is the ability to participate in an activity to build relationship with others and respect them to achieve the same goals (Le, Janssen, & Wubbels, 2017; Sari, Prasetyo, & Setiyo, 2017). Indicators of collaboration competence are actively contributing; working productively; showing flexibility, compromise, responsibility, and respect (Greenstein, 2012).

METHOD

Participant, Population, Samples, and Sampling

This study is conducted in Indonesian Language and Literature Education Department of Muria Kudus University on the students who take the course of basic education. The population are all first semester students with total of 7 classes. The samples consist of 4 classes with total of 126 students. The samples are taken using stratified random sampling.

The population are all first semester students who take the course of basic education in Indonesian Language and Literature Education Department of Muria Kudus University from class A to class G (7 classes). The samples are the first semester students in Indonesian Language and Literature Education Department aged 16 – 25 years old, three lecturers who work part time for 4 – 12 years. Observation is conducted as a method to ensure the learning method implemented by three lecturers. The experimental class consists of group IA (class A & class C) and group IIA (class B & class D). The control class consists of group IB (class B & class D) and group IIB (class F & class H) in Indonesian Language and Literature Education Department with total of 40 – 41 students in each class. Students in IA and IIA belong to experimental class with total of 82 students. Students in IB and IIB belong to control class with total of 81 students. The sampling technique is stratified random sampling based on the quality of classes in Indonesian Language and Literature Education Department (high, adequate, and low levels). The group determination of three different levels in each class is based on the data of pre-test before this study carried out.

Data Collection Technique

Questionnaire

In developing questionnaire, the researchers use relevant literatures to view the PBL collaborated with PjBL. Based on the literature review, there are several criteria used to test the effectiveness of learning model. To obtain validity and the questionnaire not to be ambiguous, it is examined by linguists and educational psychologist. The questionnaire consists of 7 questions.

Interview

The information related to lecturers' perceptions on the effectiveness of PBL collaborated with PjBL in the course basic education are collected using interview. Moreover, it is utilized to obtain suggestions about PBL collaborated with PjBL after

being implemented. The interview guidelines are open questions about the evaluation, effectivity, learning objectives, and suggestions related to PBL collaborated with PjBL.

Test

Test is used by the researchers to investigate the effectiveness of PBL collaborated with PjBL in the course of basic education and to determine the differences before it is implemented and after it is implemented. The number of instruments in a test is 15 questions which have been verified and stated to be valid.

Focus Group Discussion (FGD)

After implementing PBL collaborated with PjBL in the course of basic education, the next steps are to share questionnaire, conduct interview, conduct test, and conduct FGD. This activity involves experts of learning model developer (a lecturer from Indonesian Language and Literature Education Department), lecturers of basic education course, students (samples), and the researchers. It is carried out to determine the strength and weaknesses of PBL collaborated with PjBL.

Procedure

This study implements mixed method of descriptive evaluative design and experimental research to evaluate learning model in the course of basic education. The researchers utilize design of research group implemented by Fraenkel et al. (2012) namely 2 try-out groups. From those groups, one group acts as control class, and other group acts as experimental class. Both of them are given pre-test. The control group is given treatment using learning model that mostly used lecturing method in that class. The experimental class is given treatment using PBL collaborated with PjBL that has been developed. Treatments in control class are given in two meetings. In the end of treatments, both groups are compared to measure the difference level of them. Moreover, interviews and questionnaire are utilized to investigate the lecturer's and students' responses or suggestion about the learning model implemented.

This experiment was carried out in August 2021 to January 2022. It involves 2 lecturers in class A & class C (group IA) and 2 lecturers in class B and class D (group IIA). The control group also involves 2 lecturers in class B & class D (group IB) and 2 lecturers in class F & class H (group IIB). The lecturers do learning experiment in the course of basic education by implementing PBL collaborated with PjBL based on the guidebook of Learning process for students in Indonesian Language and Literature Education Department of Muria Kudus University. Before conducting experiment, the experimental group and control group are given the same test in pre-test and post-test. After doing it, they are given the same post-test. The results of pre-test and post-test are calculated its normality and homogeneity.

Data Analysis

Technique in analyzing data uses triangulation mix-method design (quantitative and qualitative research methods) embedded type i.e. analyzing quantative and qualitative data simultaneously (Sugiyono, 2011:46). Furthermore, the analysis results are used to

understand the research problems. In this case, quantitative data provides ways to generalize the qualitative data which give information about context and place.

Quantitative test is carried out using t-test. The researchers implements SPSS program version 16 to achieve accurate data calculation. The descriptive qualitative analysis is done to the validation sheets and observation sheets in the implementation of PBL collaborated with PjBL to improve students' learning outcomes in the course of basic education. Furthermore, qualitative analysis is carried out to describe students' learning outcomes when PBL collaborated with PjBL is implemented in the teaching and learning process. The triangulation analysis is carried out by analyzing both data (qualitative and quantative data) and comparing its result. The next step is to interprete whether both data support each other or not.

The data collection in this data is started from lecturer's and students' need analysis by viewing the curriculum documents, lecturer's learning tools, and data analysis of students' achievement results in the course of basic education. The results of research stages can be viewed in table 1.

Table 1
Data collection instruments

Stage	Recorded Data	Instrument	Response
Need Analysis	-completeness data of learning tools	-assessment instrument of completeness	Lecturer
	-implementation data of learning tools	learning tools -observation	Lecturer
	-curriculum data analysis -data analysis of learning outcomes	instrument of learning process -instrument of	Head of department
	-social interaction between students and learning outcomes	questionnaire -assessment instrument of learning outcomes -Assessment result	Lecturer Lecturer
Try-out			
a. Expert	Validity of learning model and learning tools	-Validation sheet	- Education expert, learning model expert
b. User small group test	Suggestions about the implementation of learning model and readability of evaluation instrument	Open questionnaire	Lecturers and Students
c. Field test	Implementation of learning syntax, students' responses, social interaction, learning outcomes	Observation sheet Questionnaire Questionnaire Test	Observation Students Students Students

The PBL collaborated with PjBL in the course of basic education has been developed based on the needs of students and lecturers in Indonesian Language and Literature Education Department. This learning model is designed by integrate the syntax of PBL and PjBL. This designing step aims to obtain double benefit from both learning model.

Problem based learning requires a lot of collaboration and trains students to be able to solve problems, join discussion and presentation. PjBL requires students to work scientifically and trains them to have scientific skill such as observing, doing experiments, and any other project based activities. Each model has its own characteristics and advantages. When it is collaborated, students achieve more maximum advantages.

The syntax of problem based learning consists of five stages, namely students' orientation to the problems, organizing students to learn, guiding experiment in groups or individually, developing and presenting work, analysing and evaluating the problem solving process. The syntax of project based learning consists of six stages, namely asking questions of problem solving, designing product, making schedule, monitoring students' activeness and their project developments, testing result, evaluating learning experiences. This study is collaboration activities of both learning models. This collaboration produces new syntax of PBL collaborated with PjBL.

The draft of PBL collaborated with PjBL has been developed. Furthermore, it is validated by the learning model expert and education expert to get their suggestions. Those suggestions are utilized to revise the draft of PBL collaborated with PjBL. Moreover, Forum Group Discussion is carried out to investigate the strength and weaknesses of it, and also obtain suggestions from lecturers and stakeholders. Their suggestions are used to accomplish the PBL collaborated with PjBL before being implemented. It is carried out to know its effectiveness.

To investigate its effectiveness, the experiment is carried out. It is conducted in 8 classes namely class A – class H. The experimental group I consists of group IA (class A & class C) and group IIA (class B & class D). The control group consists of group IB (class B & class D) and group IIB (class F & class H).

This experiment was carried out in August 2021 to January 2022. It involves 2 lecturers in class A & class C (group IA) and 2 lecturers in class E and class G (group IIA). The control group also involves 2 lecturers in class B & class D (group IB) and 2 lecturers in class F & class H (group IIB). The lecturers do learning experiment in the course of basic education by implementing PBL collaborated with PjBL based on the guidebook of Learning process for students in Indonesian Language and Literature Education Department of Muria Kudus University. Before conducting experiment, the experimental group and control group are given the same test in pre-test and. After doing it, they are given the same post-test. The results of pre-test and post-test are calculated its normality and homogeneity.

The normality test consists of eight group samples. Each group consists of 45 students. The samples in IA consist of four groups. The samples in IIA consist of four groups. In the calculation process, the value of *Asymp* Sign is higher than the value of α = 0,05. Therefore, it can be concluded that the samples come from the normally distributed population. The results of normality test can be viewed in following tables.

Table 2
Results of normality test in class IA

No	Class	Value of *Asymp* Sig	α	Description
1	IA	0.124	0.05	Normal
2	IIA	0.156	0.05	Normal
3	IB	0.160	0.05	Normal
4	IIB	0.245	0.05	Normal

Explanation:
IA   : Pre-test of experimental group in class IA
IIA   : Post-test of experimental group in class IIA
IB   : Pre-test of control group in class IB
IIB   : Post-test of control group in class IIB

Table 3
Results of normality test in class IIA

No	Class	Value of Asymp Sig	α	Description
1	IA	0.171	0.05	Normal
2	IIA	0.117	0.05	Normal
3	IB	0.171	0.05	Normal
4	IIB	0.270	0.05	Normal

Explanation:
IA   : Pre-test of experimental group in class IA
IIA   : Post-test of experimental group in class IIB
IB   : Pre-test of control group in class IB
IIB   : Post-test of control group in class IIB

Result of Homogeneity Test

Based on the homogeneity test, the variance of population is obtained as follows.

Table 4
Results of homogeneity test

No	Class	df	Value of Sig	α	Description
1	IA	160	0.717	0.05	Homogeneous
2	IB	160	0.732	0.05	Homogeneous
3	IIA	159	0.745	0.05	Homogeneous
4	IIB	159	0.651	0.05	Homogeneous

Explanation:
IA   : Experimental group in class IA
IB   : Control group in class IB
IIA   : Experimental group in class IIA
IIB   : Control group in class IIB

Based on the result of homogeneity test in table 4, it is clear that the value of sig is higher than 0,05. Therefore, it can be concluded that the variance of population is homogeneous. Furthermore, the description results of pre-test and post-test can be viewed in following tables.

Table 5
Results of learning outcomes in basic education course_ IA_ experimental class_ pre-test and post-test

	N	Mean	Deviation Std	Std of Error	95% confidence interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Pre-test	81	13.7531	2.23903	.24878	13.2580	14.2482	9.00	18.00
Post-test	81	16.3210	2.07260	.23029	15.8627	16.7793	12.00	20.00
Total	162	15.0370	2.50686	.19696	14.6481	15.4260	9.00	20.00

Table 6
Results of learning outcomes in basic education course_IIA_ experimental class_pre-test and post-test

	N	Mean	Deviation Std	Std of Error	95% confidence interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Pre-test	80	16.4500	2.92480	.32700	15.7991	17.1009	12.00	22.00
Post-test	80	18.9875	2.85734	.31946	18.3516	19.6234	15.00	24.00
Total	160	17.7188	3.15067	.24908	17.2268	18.2107	10.00	23.00

Table 7
Results of learning outcomes in basic education course _IB_control class_pre-test and post-test

	N	Mean	Deviation Std	Std of Error	95% confidence interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Pre-test	81	15.2514	2.46521	.27513	12.4808	13.6200	7.00	17.00
Post-test	81	15.6545	2.02355	.22607	14.1823	15.1263	10.00	19.00
Total	162	13.8521	2.38084	.18468	13.4652	14.2385	7.00	19.00

Table 8
Results of learning outcomes in basic education course _IIB_experimental class_pre-test and post-test

	N	Mean	Deviation Std	Std of Error	95% confidence interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Pre-test	80	16.8361	2.81251	.32461	16.1678	15.2622	12.00	20.00
Post-test	80	18.5612	2.81854	.32506	17.7121	17.1861	13.00	22.00
Total	160	17.6986	3.13383	.23897	15.1244	16.1484	10.00	22.00

The results of questionnaire that has been shared to lecturers can be viewed in table 9.

Table 9
Questionnaire of lecturer's perception who implements learning model

No	Item	Initial		Ending	
		Experimental (%)	Control (%)	Experimental (%)	Control (%)
1	Studying basic education is very important	55	75	100	100
2	Delivering the material of basic education in the classroom is very easy	52	52	91	80
3	The material of basic education is enough taught using personal instruction	52	32	0	31
4	Learning by implementing PBL collaborated with PjBL is time consuming	74	51	0	21
5	I want to implement PBL collaborated with PjBL	100	100	100	100
6	I understand the learning process in which PBL collaborated with PjBL is implemented in the classroom learning	23	51	88	71
7	I understand the evaluation of basic education which implement PBL collaborated with PjBL	23	52	98	91

Based on the results of questionnaire related to lecturer's perception show that PBL collaborated with PjBL is important to be implemented in the course of basic education. The results of pre-test show lower score in which the experimental group is 55% and the control group is 75%. The results of post-test in both groups are 100%.

The results of study show that in the teaching and learning process the score of lecture's activity is 0,915 with excellent category. Students' critical thinking and problem solving achieve average score of N-Gain is 0,587 with adequate category. Students' creativity and innovation get score of 0,809. Students' collaboration competence gets score of 0,816. Their communication competence gets score of 0,825. The average results of 4C (four competencies) can be viewed in table 10.

Table 10
Average results of 4C in class IA, class IIA, class IB, and class IIB

No	Class	Critical Thinking	Creativity	Collaboration	Communication
1	IA	0.590	0.812	0.819	0.828
2	IIA	0.587	0.809	0.816	0.825
3	IB	0.586	0.808	0.815	0.824
4	IIB	0.585	0.807	0.814	0.823
Mean		0.587	0.809	0.816	0.825

DISCUSSION

The data of students' test score in basic education course; which is analysed using t-test; have been tested its normality and homogeneity. Statistically the value of t_{table} was 3.91 at the significance level of 0.05. Since $t_{calculation} > t_{table}$, it can be concluded that PBL collaborated with PjBL provides significant influence in improving students' learning

outcomes in basic education course at Indonesian Language and Literature Education Department of Muria Kudus University.

Based on the results of study, the lecturers have to adjust students' learning needs with the learning strategy. Multiple models of instruction are a practice in implementing several different learning models in a learning process. The choice of learning model is determined by the characteristics of learning materials, learning objectives, skill in fulfilling students' learning needs, and skill in increasing students' learning capacity (Darmuki, et. al., 2017). In line with Arend (2018) who states that it is impossible to have one learning model which is more superior for all aims of study. In fact, each learning model is appropriate for specific type of learning. However, these learning models can be combined to facilitate students to achieve learning objectives (Affandi, et. al., 2022). There is no approach which is consistently better than others.

The implementation of PBL collaborated with PjBL is a combination of problem based learning and project based learning. Based on the findings, it can be said that PBL collaborated with PjBL is more effective than lecturing method. So, several previous studies can be references. The results of it show that PBL is more effective to improve students' academic ability than traditional learning (Gunawan, et. al., 2019; Palupi, et. al., 2020). A study with the effectiveness of learning outcomes concludes that cooperative learning has positive influence on the achievement variable (Darmuki, et. al., 2017).

The results of study in implementing PBL collaborated with PjBL are also supported by the research related to PjBL which reveals the significant difference between experimental group and control group related to the average score of academic achievement, learning retention value, and students' perception about skill in conducting projects on cognitive or affective level (Ojaleye & Awofala, 2018; Utami & Gianti, 2020; Triana, et. al., 2020). These results are confirmed by other research about the discovery learning which is better than traditional learning viewed from academic achievement (Prayoga & Setyanigtyas, 2021). A study by Triana, et. al. (2020) shows that students have better achievement in understanding learning content using PjBL compared to lecturing method.

Based on the research findings, PBL collaborated with PjBL has positive impact on the students' social competence. PBL collaborated with PjBL can potentially improve students' social interaction in basic education course. It is important regarding the different characteristics of students in the classroom learning (Darmuki & Hariyadi, 2019). The use of PBL collaborated with PjBL using scientific work in cooperative groups, so this learning model is able to prevent the gap between students who have high and low academic levels, prevent the gap between students who have different backgrounds, reduce negative effect of competitive learning (Afifah, et. al., 2019; Choden & Kijkuakul, 2020). Students' interactions in problem based learning are related to project based learning activity to find concepts or facts using scientific stages. In problem based learning, social interaction is maximized in presentation and discussion activities to build concept of basic education course.

The result of this study reveals that PBL collaborated with PjBL is more effective than the lecturing method. The literature review about classroom learning reveals that the implementation of PBL collaborated with PjBL is more effective (Fatmawati & Sujadmika, 2018). A study conducted by Palupi, et .al. (2020) has collaborated PBL learning with geogebra model; it shows that the learning activities are effective and fun. Another research conducted by Prayoga and Setyaningtyas (2021) reveals that PBL learning collaborated with problem solving can improve students' competences and understandings to master the learning concepts. Previous study conducted by Darmuki and Hidayati (2019) implements Problem based learning which can improve students' learning outcomes. The learning strategy including learning model will influence the success of learning objectives. Lecturer's skill in implementing learning model can make students to be easier in achieving learning materials (Darmuki, et. al., 2018).

The weakness of this study is the lecturer's commitment to implement PBL collaborated with PjBL in which the problem based learning is more dominant than Project based learning. Another weakness is the students are less competitive in the learning process, so several students dominate it. However, all of students are active in the end of learning. The advantages of this study are the social interaction in the learning process and students' needs which is fulfilled, so it can develop students' understanding in basic education course. The implementation of PBL collaborated with PjBL is proven in this study in which the basic education course is taught. Students think that it is easier for them to understand the learning materials, so their competencies related to basic education are better.

CONCLUSION

The results of this study are very important for the learning of basic education course. The PBL collaborated with PjBL has positive influence on students' success and effectiveness of classroom learning. It can be concluded that PBL collaborated with PjBL is more effective than conventional one as it is able to improve students' understanding in basic education course at Indonesian Language and Literature Education Department. This study provides descriptions for students, lecturers, and academics about the quality improvement of learning process and learning outcomes when PBL collaborated with PjBL is implemented. It is inseparable from the roles of lecturers, students, appropriate learning model or method in producing good learning outcomes, and another factors. Future researches are needed to test the practicality and effectiveness of PBL collaborated with PjBL and other learning model to investigate the students' learning outcomes in the course of basic education. The implication of this study is to provide understanding for lecturers to improve 4C skills by implementing the PBL collaborated with PjBL and emphasizing problems through activities which are suitable for students.

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