The Influence of PBL vs PJBL Learning Models and Initial Knowledge on the Ability to Write Research Proposal

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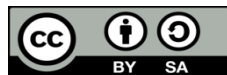
A B S T R A K

Rendahnya kemampuan mahasiswa dalam proposal penelitian kepenulisan menjadi salah satu masalah yang cukup besar mengingat untuk berkompetisi dalam bidang pendidikan kemampuan menulis merupakan suatu keharusan bagi seorang mahasiswa. Guru perlu menerapkan model pembelajaran yang sesuai dalam membimbing siswa dalam menulis proposal penelitian guna mencapai tujuan pembelajaran. Tujuan penelitian adalah menganalisis perbedaan dan interaksi kemampuan menulis proposal penelitian antara model pembelajaran PBL dengan model pembelajaran PjBL pada pengetahuan awal tinggi dan rendah. Penelitian ini dilakukan dengan desain kelompok kontrol non-ekuivalen dengan menerapkan desain faktorial 2x2 pada desain eksperimen. Subyek penelitian adalah mahasiswa semester genap tahun akademik 2021/2022 pada program studi Teknologi Pendidikan Universitas Adi Buana Surabaya yang berjumlah 122 orang. Subjek diambil secara acak, dan jumlah anggota sebanyak 80 subjek. Selanjutnya, mereka dikelompokkan menjadi dua kelas sesuai dengan desain penelitian. Hipotesis penelitian diuji dengan Statistical Analysis of Variance (Anova). Hasil penelitian menunjukkan bahwa (1) terdapat perbedaan kemampuan menulis proposal penelitian antara siswa yang dibelajarkan dengan model pembelajaran PBL dan model pembelajaran PjBL, (2) terdapat perbedaan kemampuan antara siswa yang memiliki pengetahuan awal tinggi dan rendah, (3) tidak terdapat interaksi antara model pembelajaran dan pengetahuan awal terhadap kemampuan menulis proposal penelitian.

A B S T R A C T

The low ability student in authorship research proposal becomes one of the big enough problems to remember to to compete in the field of education ability to write is a must for a student. Teacher need to apply suitable learning model in guiding students in writing research proposal in order to achieve target of learning. The research objective was to analyze differences and interaction in the ability to write research proposals between the PBL learning model and the PjBL learning model in high and low initial knowledge. This research was conducted with a non-equivalent control group design by applying a 2x2 factorial design to the experimental design. The research subjects were students in the second semester of the 2021/2022 academic year, in the Educational Technology study program at Adi Buana University, Surabaya, which consisted of 122 people. Subjects were taken randomly, and the number of members was 80 subjects. Furthermore, they were grouped into two classes according to the study design. The research hypothesis was tested with the Statistical Analysis of Variance (Anova). The results showed that (1) there were differences in the ability to write research proposals between students who studied with the PBL learning model and the PjBL learning model, (2) there were differences in the abilities to write research proposals between students with high prior knowledge and low, (3) there is no interaction between the learning model and prior knowledge on the ability to write research proposals.

1. INTRODUCTION

Education is very important for human life. With education it is hoped that there will be developments in the mindset and behavior of humans. In addition, education is also expected to make a contribution in the life of society and the state. This is in accordance with the function of education stated in RI Law no. 20 of 2003 concerning the national education system in chapter II article 3 which contains the core that national education functions to develop abilities and form character in the context of educating the life of the nation (Stuchlikova, 2016; Stukalova, 2017). Therefore, the existence of a teaching system used in education should be designed as attractive as possible so that students' interest in learning increases and students' critical thinking skills can be well formed (Putri et al., 2020; Sulisworo et al., 2020). Problem-based learning is a method of curriculum development and learning that allows students to play an active role in problem solving when faced with problems that are less structured in the real world. Problem-based learning is the use of various kinds of intelligence needed to confront real-world challenges,

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the ability to deal with all kinds of new things and existing complexities (Happy & Widjajanti, 2016; Imam et al., 2018; Kurniawan & Wuryandani, 2017). Based on the underlying theory, *Problem Based Learning is* included in several theories. One of the educational theories is Piaget's theory of development. On developmental theory cognitively, Piaget emphasized that there is great curiosity in children and they will seek to understand the world (Hanafi & Sumitro, 2020; Juwantara, 2019; Piaget, 1970). The cognitive constructivist perspective is the basis of problem-based learning. Student can be actively involved in obtaining information and building their knowledge itself because the nature of knowledge is dynamic so that when a learner faced with a new experience and forced to build and modify then will occur development knowledge. Pedagogy which good will involve the child to experiment, manipulate something, ask questions and look for answers according to one's own abilities, and compare the results findings with some variable which others (Ibda, 2015; Marinda, 2020; Mifroh, 2020).

According previous study Piaget's theory of cognitive development concludes that Humans are not passive creatures in developing their genetics (Al-Shidhani & Arora, 2012). However exist development genetics will Becomes active when adjustment to environment exists and there is interaction with the environment. Piaget held that view development cognitive is results from connection brain, system nerve as well as experience for adapt with the environment which exists. Thus it can be concluded that problem-based learning is model learning which invite student for solve problem which not enough structured in the real world in the learning process (Nurrohma & Adistana, 2021; Rostika & Junita, 2017; Suryani et al., 2020). Based learning model problem requires students to learn based on a problem or a solution to a problem, so that model this could push student for active, push student for study in a manner collaborative, and allows students to choose what they want to learn and how the method learn (Charlton-Perez, 2013; Festiawan et al., 2021; Wicaksono & Susilo, 2019). There is method learning *project based learning* (*PjBL*) is one of development model from theory study constructivism. In theory constructivism It is stated that humans as learners must build their own knowledge in context experience. Learning based project require a student become more active in the learning process (Abidin et al., 2020; K. J. Kim, 2020; Sumarni et al., 2016). In this case a teacher also plays a role help student do reflection or evaluation to process solving problem which is or has been done. According to view constructivist, study is something process which must passed information of knowledge and development of students' mindsets (Beneroso & Robinson, 2022; Cattaneo, 2017). In this case the student must being active doing activities, active thinking, active drafting concepts, and giving meaning of what is being studied. But the most basic thing in this concept is magnitude intention student in study, temporary role teacher in theory constructivism is help so that the process of building or constructing students' knowledge runs accordingly with which are expected (Hussein, 2021; Pratiwi et al., 2018; Santyasa et al., 2020).

Based on the advantages of the two innovative learning models above, it can be concluded that model learning based project (PjBL) and model learning based problem (PBL) have impact positive to achievement study student specifically on eye lesson methodology study (Anazifa & Djukri, 2017; Bechter & Swierczek, 2017; H. W. Kim & Kim, 2021). The low ability student in authorship research proposal becomes one of the big enough problems to remember to to compete in the field of education ability to write is a must for a student. More complete knowledge and scheme beginning someone about a particular topic, the easier it is for them to process the information new and look connection which more abstract. The ability of student in absorb ideas new depend on knowledge previously and structure cognitive which exists (Hawari & Noor, 2020; Yusri, 2018). Students are tasked with managing in-depth learning material, activating, connect and integrate learning new, give instructions for retrieve information from long-term memory for transfer to short-term memory. Thus, students' initial knowledge can be a guide for lecturers in designing and planning lessons. Initial knowledge test results form the basis planning and development learning methodology study in period future, so that students can more easily, quickly, and better understand the learning material (Abidin, 2020; Saputro & Rayahu, 2020; Sumarno, 2019).Based on matter the in on, formula problem obtained, 1) is there is differences in the effect of applying the project-based learning model (PjBL) and learning based problem (PBL) about ability write proposals study; 2) is there is differences in ability to write research proposals between high and initial knowledge low; 3) is there an interaction between the learning model and prior knowledge of ability write proposals study. Therefore the aims of this study is to analyze differences and interaction in the ability to write research proposals between the PBL learning model and the PjBL learning model in high and low initial knowledge.

2. METHODS

Study design or design study use *non-equivalent control* design group version factorial 2x2. Draft experiment pseudo this implemented in a pilot study in class using whole groups (intact groups). Subject in a manner random assigned to group experiment and group comparison is impossible. This research

was conducted on students assigned to classes certain who does not could separate. Draft experiment quasi this done in study experiment in class which use group intact (*intact group*). Subject in a manner random as group experiment and group comparison no possible done. Study this done on student which has set in certain classes cannot separated. Procedure *the* version of non-equivalent control group design is show in Table 1.

Table 1. Procedure *the version of Non-equivalent control Group Design*

O1	X1Y1	O2
O3	X2Y1	O4
O5	X1Y2	O6
O7	X2Y2	O8

Table 1 shows the experimental procedure for a 2x2 factorial design. O symbol with index 1, 3 in the image is *pretest* . The symbol O with index 2, 4 is ability write research proposals. The symbol Y is *prior knowledge* with Y1 is *prior knowledge* tall and Y2 is *priors knowledge* low, whereas symbol X is model learning with X1 is model learning PBL and X2 is model learning PjBL. *Prior knowledge* is a combination of knowledge and skills. *Prior knowledge* can be defined as whole knowledge actual somebody because: (1) has there is before happening learning, (2) structured in schemata, (3) as knowledge declarative and procedural, and so on. The existence of prior knowledge can play a role urgent to ability solving problem. Student will have ability problem solving is high if it is based on strong prior knowledge. Besides that, the existence of prior knowledge can influence directly and indirectly in process learning. Variables in study this involve one variable free, one variable moderator and one variable bound which consists from: (1) variable free is variable which manipulated and tested influence on variable bound that is: model learning

Project Based Learning (PjBL) and *Problem Based Learning* (PBL) learning models; (2) moderator variable is the variable being measured, selected to find out if it participates changing the relationship of the independent variable to the dependent variable, namely: *prior knowledge* tall (PAT) and *priors knowledge* low (PAR); (3) variable bound is variable which observed and measured to find the effect of the independent variables, namely: the ability to write proposals study (KMP). Beside that there is variable control which no manipulated but suspected could influence validity internal experiment which endeavored constant. This research involves one independent variable, each of which has two dimensions. Treatment model learning that is, model learning PjBL and PBL. Variable moderator is *priors knowledge* that is, PAT and PAR. Variable moderator researched influence against KMP. There are two independent variables which are the treatments whose effects are examined to one dependent variable. The column factor is the treatment of the PjBL learning model compared to the PBL learning model. The row factor is the *prior knowledge of* PAT compared to with *priors knowledge* PAR. Designs factorial experiment 2x2 is show in Figure 2.

VARIABLE		**Model Learning**	
		PjBL	PBL
Prior Knowledge	PAT	Y111, Y112Y12n	Y121, Y122Y12n
	PAR	Y211, Y212Y21n	Y221, Y222Y22n

Figure 2. Designs factorial experiment 2x2

The subject of this study this is student semester II year academic 2021/2022 Program Studies Educational Technology (TEP) PGRI Adi Buana University, Surabaya. Research subjects consist 3 classes of 122 people. The number of TEP research subjects is 80 people. The detail is show in Table 1.

Table 1. Subject of Study

Population	**Amount**	**Sample**	**Amount**
TEP Class A	42	TEP Class A	47
TEP Class B	47	TEP Class B	43
TEP Class C	43		
Total	**122**		**80**

The sample selected in the study amounted to 80 people. 2 students class of 80 people. The research sample was taken randomly according to the cluster stages with use technique *clusters random sampling*. The sample is taken randomly, where the class is taken randomly. Sample study got two class consists from two class Technology Education. The treatment in this experiment is in the form of an applied learning design *PBL* and *PjBL* learning models. The learning design process is carried out by develop learning procedures that apply learning models. There are two group treatment, namely: one group taught with learning model *PBL* and group others are taught with model learning *PjBL*

3. RESULT AND DISCUSSION

Results

Results calculation for test Ho-1, column source variation and variable bound the ability to write research proposals with the main influence line learning model. The test results show that the F value is 5.589 and the probability is 0.021<0.05 so that Ho-1 rejected. Results testing contain meaning that, there is difference write proposals study Among student which study with model learning PBL and model learning PjBL . Results testing Ho-2 show mark F as big 20,907 and probability as big 0.000<0.05 so that Ho-2 rejected. Results testing this show that Ho-2 rejected which contain meaning that there is differences in ability to write research proposals between students with knowledge initial high and low. The results of the Ho-3 test are presented in columns of sources of variation and variables bound row interaction MODEL* CONTROL for the dependent variable ability to write proposals study. Tests that produce an F value of 0.165 and a probability of 0.686>0.05 so that Ho-3 accepted. Results testing this show that no there is interaction between learning models and prior knowledge of writing skills proposals study on students.

Discussion

The effect of learning models on the ability to write research proposals previously discussed which resulted the statement that the project-based learning model has a significant effect on ability write creation scientific student (Aghayani & Hajmohammadi, 2019). Based results testing hypothesis first proves that there are differences in the ability to write research proposals between students who study with the *PBL learning* model and the PjBL learning model. The *PjBL* learning model is implemented by assigning project assignments to students who then the project assignments are carried out by students into a product (Jalinus et al., 2019; Sari et al., 2019). There is method learning like this will give encouragement to student in solve problem in a manner *stereotype* . Whereas model learning *PBL* is something learning which focus in settlement something problem by student (Harisantoso et al., 2020; Sumarni et al., 2016). There is problem real used as context for para participant educate study think critical and deep skills finish problem too for obtain knowledge during the process solve the problem.

Then the results of testing the second hypothesis proved that there was a difference ability to write research proposals among students with prior knowledge or high and low *prior knowledge .* In students with high initial knowledge writing research proposals is much better when compared to students with low prior knowledge. This is in accordance with several studies such as research with results show that there is a relationship between prior knowledge and authorship ability (Mwei, 2017). Other study also state the higher level of students' initial knowledge, the more tall also the relationship (Hernández et al., 2020). The results of testing the third hypothesis show that there is no interaction between the models learning and knowledge beginning to ability writes proposals study. So it can be concluded that the learning models are both PBL and PjBL and there are encouragement knowledge beginning student in a manner together no have influence on ability write proposals student research.

The implications of the study in this study are providing theoretical excellence. This expected research can add to the examination of evidence for the effectiveness of project-based learning and problem-based learning models in relation to student abilities for write proposals study in eye studying methodology study, Moreover for practical benefits. Expected study this could use by educator as solution for identify model learning which appropriate for hone ability write proposals study. However, this research has limitations. One of the limitations of this research is that the research subjects are still too limited. Therefore, it is hoped that future research will be able to further deepen and broaden research and consider other aspects related to the PBL and PJBL learning models.

4. CONCLUSION

Based results there is difference ability write proposals study Among student which study with model learning *PBL* and model *PjBL* learning. Then there are differences in the ability to write proposals

study among student with knowledge beginning tall and low. Moreover there is none interaction among model learning and knowledge beginning to ability write proposals study.

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