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THE LEARNING SKILLS OF ENGLISH AS A FOREIGN LANGUAGE (EFL) STUDENT-TEACHERS IN PROJECT-BASED LEARNING AND CASE-BASED LEARNING

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Abstract: As a new curriculum, Merdeka Belajar is expected to provide a learning experience enabling the students to articulate the knowledge and information they obtain to solve real-world problems. It is believed that CBL and PjBL are able to make it happen. Therefore, this study aimed to investigate what learning skills functioned regarding the implementation of case-based learning (CBL) and Project-Based Learning (PjBL); and probe if the two learning models have a statistically significant difference in the learning skills of the student-teachers. One-group post-test design and non-randomized sampling were used to select the participants. Two sets of questionnaires were administered to 20 EFL student-teachers as participants to obtain their perceptions about the implementation of CBL and PjBL. The findings revealed learning skills that

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functioned in the use of CBL included cognitive, critical thinking, and communication skills, whereas, in PjBL, they were critical thinking, learning engagement, and cognitive. However, the result of paired sample t-test showed that there was no significant difference statistically between the use of CBL and PjBL on the learning skills of the student-teachers. It is suggested that future researchers investigate the difference between the two learning models in different settings with different designs and large participants.

Keywords: *Case-based Learning (CBL), Project-based Learning (PjBL), learning skills, EFL student-teachers*

INTRODUCTION

Teacher education institutions should consider their accountability to ensure that their teacher candidates can perform their tasks by educating students eloquently about the current circumstances. They are expected to have some degree of hard skills and soft skills (Vogler et al., 2018; Novitasari et al., 2020); provide the learning resources they need to evaluate and prepare their students for employment in the 21st-century workplace. Cognitive and professional skills are part of the hard skills, whereas problem-solving and teamwork are part of the soft skills (Nair & Fahimirad, 2019; Novitasari et al., 2020). However, some teacher education institutions continue to use conventional teaching-learning, that makes achieving these skills difficult since it depicts student-teacher as receivers and lecturers as the sole bearers of the knowledge (Abah, 2020; Dimitrios et al., 2013; Schwerdt & Wuppermann, 2011). The student-teachers are expected to completely engage in their learning so that their school knowledge could be put into practice i.e., in their own future classroom life. Besides, the student-teachers will play a crucial role of their students' learning, and have the capacity to significantly affect their students' lives (Siregar et al., 2022). Consequently, teacher education should attempt to develop more effective teaching and learning methods. Student-teachers should be taught to undertake activities

systematically, carefully consider and examine experiences, make connections between old and new knowledge, solve issues, and generate new ideas. In line with this, the teaching-learning process in teacher education institutions should aim to establish learning experiences that can equip teacher candidates to face 21st-century classrooms. Critical thinking, problem solving, creativity, metacognition, communication, digital and technology literacy, civic duty, and global awareness are among the characteristics considered as the 21st-century skill set (Joynes et al., 2019; Care et al., 2018). As teaching itself is a lifelong learning profession, they need to practice how to learn something and how they can make use of what they learn. When teacher candidates learn something and find meaning in it, they are motivated to continue learning (Fernandes, 2014; Kuhn et al., 2022).

Facing 21st-century education in which information communication enables fast exchange of information, teachers should be able to teach relevant knowledge and disciplines, teach how to learn, promote thinking skills, encourage the transmission of learning, address misunderstandings directly, treat teamwork as an outcome, use technology to reinforce learning, and nurture creativity (Halim et al., 2017). Therefore, contemporary education systems now embrace a constructivist philosophy of learning (Piaget, 1950; Hanfstingl et al., 2019) that demands students be capable of managing their learning process, handling real-life problems, and working on complex projects, as well as benefit from technology-enhanced learning environments. Towards that intent, Indonesian government issued *Merdeka Curriculum* which is developed in an effort to revitalize learning by emphasizing essential materials and simultaneously fostering students' competency and characters (Merdeka Belajar, n.d.). This curriculum is characterized with (a) Project-based learning for the improvement of character and soft skills in line with Pancasila student profile, (b) Concentrate on the essentials to allow enough time for in-depth study of fundamental skills like literacy and numeracy, (c) flexibility for teachers to adapt material and situations locally and (d) provide differentiated instruction based on students' ability

(Kemendikbudristek, 2022). Accordingly, the newly issued curriculum strongly recommends project-based learning. Furthermore, in the context of higher education, the curriculum is implemented through eight program of *Merdeka Belajar Kampus Merdeka (MBKM)* i.e., (1) student exchange, (2) apprentice, (3) teaching assistant, (4) research, (5) humanitarian project, (6) entrepreneur, (7) independent study, and (8) thematic community service (Directorate General of Higher Education Ministry of Education and Culture, 2020). This national policy is in line with the constructivist paradigm noting that students need to have responsibility and authority over their learning.

The new curriculum characterized with constructivist learning entails more student-centered, interactive, and collaborative teaching-learning activities. It suggests that student-teachers are provided with an opportunity to participate in real problem-solving and knowledge construction in authentic professional contexts. Besides, the need to link what is learned in class with real-world experience is an inevitable issue in teacher education. Several instructional practices are employing a constructivist learning paradigm to provide meaningful learning opportunities by creating knowledge actively through hands-on activities. CBL (Sklyar, 2020; Yu, 2020; Gebhard, 2005; Topperzer et al., 2022; Hou, 2019; Büchler et al., 2021) and PjBL (Simpson, 2011; Dewi et al., 2012; Denuga & Nkengbeza, 2022; Dag & Durdu, 2017; Alrajeh, 2021) have been encouraged as effective and widely used learning models under the constructivist approach for various learning environments. As student-centered teaching models, they promote greater cognitive processing, as demonstrated by problem-solving abilities, creativity, and self-management.

Teachers' knowledge of teaching is more than just a collection of scientific information and theories; it is also highly experiential and socially formed, based on their own experiences and classrooms. Consequently, student-teachers should be given authority over what and how they study in an environment that supports them. The practical knowledge gained in a real-life classroom teaching environment provides a form of sensing of the classroom" that is not

primarily based on the intelligence of the brain. A case allows the student-teachers to learn about a real-world situation regarding a choice, challenge, opportunity, conflict, or issue faced by someone or some groups within an organization (Pando & Aguirre-Muñoz, 2021). It actively promotes transferrable knowledge and is encouraging students (Akbulut & Hill, 2020). When students are forced to extract concepts from case data and respond to open-ended abstruse issues based on the case, it is supposed to give them a deeper, richer learning opportunity. Learning with cases is engaging since it immediately involves students in organized tasks that build on the case's preliminary study. Analyzing case data and solving open-ended abstruse problems with the data would allow students to learn., CBL should produce deeper, richer learning experiences.

Case-based learning has been acknowledged for it prospectively allows learning through self-directed action (Rezaee & Mosalanejad, 2015), positive communication changes and more emotional dialogues (Sanders-Smith et al., 2016), and enhances a capability for solving problems (Yoo & Park, 2015). Akbulut & Hill (2020) the use of cases supports prospective teachers' socio-scientific issue-based teaching and learning. The learning model was found successful in both physical and virtual environments with one-to-one and group versions (Hoffer, 2020). Furthermore, students that use the cases in their studies may better understand topics, acquire new abilities, feel happier with their learning, and build confidence and critical thinking(Hoffer, 2020). In addition, Yu (2020) revealed that the learning model maximizes self-efficacy and motivated the Chinese EFL both intrinsically and extrinsically. Some researchers investigating some types of case-based learning ranging from context and mode have found that the learning model successfully and efficiently connected conceptual theory to practice (Topperzer et al., 2022) and boosted coursework performance (Kulak & Newton, 2015). There is a plethora of studies on case-based learning in many fields; yet, using cases as resources of learning in language teaching is a scarcity of investigation in teacher education contexts.

Another constructivist learning model is PjBL which includes students in knowledge development by having them execute important tasks and create original products or services (Büchler et al., 2021; Shin, 2018). It can be seen from this standpoint that PjBL has constructivist features such as activating previous knowledge, enabling exploration, and being student-centered. (Tsybulsky & Muchnik-Rozanov, 2019). They further stated that the project is delivered to guide pupils through the learning process. It is a student-centered learning model involving the students in accomplishing a project that allows them to solve an issue in their community or environment (Alrajeh, 2021). PjBL does not only offer students with subject knowledge; it also helps them develop psychomotor and social skills including finding information from multiple sources, critical reasoning, problem-solving, self-assessment, conducting evaluation, summarizing and synthesizing, and presenting, all of which are strongly recommended for lifelong learning. Krajcik and Shin (2014) outlined six elements of PjBL, they are; a central question, an emphasis on learning objectives, participation in learning activities, student cooperation, the use of scaffolds, and the development of physical artifacts. In the process of developing the project artifacts, the students must collaborate to develop answers to actual challenges in the integration, application, and creation of knowledge. Students are challenged in PjBL to create artifacts that address actual issues, which is what differentiates PjBL from other student-centered practices like CBL. The teachers and school members who participate in PjBL typically serve as facilitators, giving feedback and encouraging the student teachers.

A growing body of evidence demonstrates that PjBL is effective for higher education and teacher education programs. The learning model influenced the problem-solving abilities of student teachers (Ameta et al., 2020) and their academic achievement (Abuhmaid, 2020), and had a beneficial impact on their perceptions of the teaching profession. Besides, this learning model was effective in assisting the student teachers in being more aware of their course objectives which

could enhance the learning environment for the students they are in charge of. Ljung-Djarf et al. (2014) further noted that project-based learning can motivate students to learn triggering their passion and persistence to work better on the project and to get it completed. An experimental study conducted by Bagheri et al. (2013) found that students taught employing the PjBL model outperformed those taught using a traditional teaching technique in terms of self-directed learning abilities. Furthermore, Pan et al. (2020) revealed that during PjBL, the students' subject matter knowledge, skills, and motivation were enhanced, despite the fact they also reported some obstacles (e.g., time-consuming). Similarly, Mahasneh & Alwan (2018) and Ralph (2015) found in his study that some students stated that they were unmotivated to work in groups.

Both learning models, CBL and PjBL, offer students chances to connect what they learn in school with real-world issues (Rezaee & Mosalanejad, 2015). However, each model comes with its idiosyncratic features. CBL places students in an environment where they must solve a specific problem. Using a real-life problem as their basis for learning, students construct knowledge by solving the problem and discovering the solution(Dewi et al., 2012). Unlike case-based learning whose output is a solution to issues, PjBL learning involves the process of production of authentic artifacts as the outcomes.

An investigation comparing the two learning models was conducted by (Sklyar, 2020). The study found that there was a different effect of project-based learning and problem-based learning on students' creativity, but there was no different effect on the students' critical thinking. It is worth noting that two learning models, case-based learning and project-based learning provide opportunities for the students to link what is learned in class with real world and serve problems as the foundation of learning (Rezaee & Mosalanejad, 2015; Yoo & Park, 2015). Referring to the similar notion i.e., constructivism, but retaining different focal features of both learning models; they are the time span and the output, the present study aimed at investigating the effect of CBL and PjBL considering learning skills functioned in the

implementation of the two learning models. The learning skills include cognitive learning, critical learning, engagement, communication skills, and teamwork Kundra (2016). Studies comparing the two learning models are still minority in numbers, although studies as such offer a practical guidance for the implementation of CBL and PjBL. Furthermore, comparing the employment of the two learning models serve as fruitful instructional options that help teachers establish a teaching-learning process that allows the enhancement of the 21st century learning skills. Besides, theoretically, the present study might confirm that CBL and PjBL are indeed characterized by the constructivism learning principles. Accordingly, the present study investigated the learning skills functioned in the implementation of CBL and PjBL, and whether there was a significant difference resulting from the two learning models implemented in the Language Assessment Course, thus the research problems were formulated as follows.

RQ1: As perceived by the student-teachers, what learning skills of the student-teachers functioned regarding the implementation of the case-based learning (CBL) model used in the Language Assessment Course?

RQ2: As perceived by the student-teachers, what learning skills of the student-teachers functioned regarding the implementation of the Project-based learning (PjBL) model used in the Language Assessment Course?

RQ3: Is there any statistically significant difference between the learning skills of student-teachers functioned in the implementation of the CBL model and the PjBL model in the Language Assessment Course?

METHOD

Design

A post-test within-subject design was employed to reveal any significant difference in the learning skills of the student-teachers' employing CBL and PjBL. The learning skills of the student-teachers

served as the dependent variable comprising five principal skills of learning adapted from Kundra (2016), i.e., cognitive, critical thinking, engagement, communication skills, and team working. A questionnaire was administered to collect data on the learning skills of the student-teacher after CBL and PjBL were implemented.

Participants

The participants of the present study were student-teachers enrolled in Language Assessment Course (LAC) and *Kampus Mengajar (KM)* at the same time, in a government university in Jambi. This government university was chosen because it has implemented *MBKM* since it is issued in 2020, and its students have actively participated in *KM* since then. *KM* is a part of the teaching assistants, one of eight programs of *MBKM*. 43 student-teachers of the English Language Education Department of the university were participants of *KM* when the present study was conducted. However, only 25 of them were required to take LAC, while the others did not have the obligation, since the course was acknowledged to be substituted in KM program. Therefore, the present study employed saturation sampling in which all members were taken as samples. However, from 25 student-teachers treated using CBL and PjBL, only 20 participants gave responses to the questionnaire given. LAC equipped the student-teachers with knowledge and skills for assessing language learners, and *KM* served as a real-world classroom that allowed them to enact the knowledge and skills obtained from LAC.

The Research Procedure

Before the implementation of CBL and PjBL, four meetings about assessing language skills were devoted to giving the student-teachers adequate theoretical knowledge base. In meeting 5, the student-teachers were randomly grouped into two big groups of ten students; group A and group B. Then, Group A and Group B were randomly divided into smaller groups, thus there were four small groups of five students; group A1, group A2, group B1, and Group B2.

Implementing CBL, Group A1 and Group A2 were instructed to solve problems about assessing reading and writing, while Group B1 and Group B2, focused on solving the problems of assessing listening and speaking they encountered at schools where they were assigned by Kampus Mengajar. Four meetings were devoted and a worksheet was developed to assist the students in following the procedure of CBL, they are; (1) the student-teachers were assigned to the school to obtain documents of teacher-made assessment, (2) the student-teachers identified and analyzed any possible issues in the product and the process of developing the assessment by doing some observation and conducted interviews, (3) The student-teacher employed related references and theories of language assessment to find a solution to the issues identified.

After CBL was implemented, following is implementing PjBL. This time, assessment projects were given to the four groups in which groups A1 and A2 were responsible for developing reading and writing assessments, whereas groups B1 and B2 constructed listening and speaking assessments. PjBL worksheet was also developed to assist the student-teachers to employ the learning model. Guided by the worksheet, five meetings were given to six activities of PjBL which comprised, i.e. (1) the student teachers were assigned to answer what item tests were appropriate for assessing language skills, (2) the student teachers made a plan and timeline to develop the project agenda appropriate item test for assessing language skills, (3) the student teachers developed appropriate test items for assessing language skills, (4) the teacher educator assisted and gave feedback during the process of item development, (5) the student teacher presented and reported their project, (6) the project and the process of finishing the project were evaluated. The research procedure is illustrated in Figure 1.

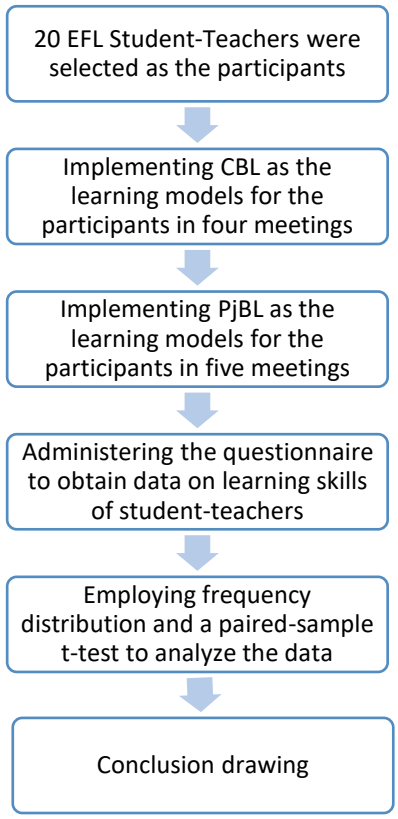

Figure 2. The research procedures

Data Collection and Analysis

Using Google-form two questionnaires adapted from Kundra's (2016) learning principles were administered to yield the EFL student teachers' perceptions about their learning after they were taught using CBL and PjBL. The scale data obtained from the questionnaires were used to measure the learning skills perceived as the changed variable of the implementation of CBL and PjBL. Descriptive statistic was employed to describe the learning principles of the student teachers at the end of the two learning interventions. To find out whether different learning models, i.e., CBL and PjBL had statistically significant differences in the learning skills as perceived by the student-teachers, a paired-sample t-test was run. The statistical test was employed since the data was evident to have a normal distribution

FINDING

Addressing the research questions the result of the data analysis is presented in three sections. The first is the results of the frequency distribution of the student teachers' learning skills after the implementation of CBL. Following is the presentation of the frequency distribution of the learning skills after the implementation of PjBL. The last presents the result of the paired-sample t-test answering if there was a statistically significant difference between the learning skills of the student-teachers after the two learning models, CBL and PjBL, were implemented.

The Learning Skills of The Student-Teachers Functioned in The Implementation of The Case-Based Learning (CBL)

The data revealed that the cognitive skills received the highest agreement among other learning skills that were perceived to function in the implementation of CBL. 88.34 % of the student teachers believed that they learn more about issues in teacher-made tests through CBL. The second highest agreement, with 88.33% of the agreement was critical thinking skills. This showed that the student teachers believed that CBL enable them to critically solve the case of the teacher-made test they obtained from the school. Communication skill, with 85% agreement, was found as the third highest skill agreed by the student teachers to be one of the learning skills functioned in the implementation of CBL. The real-world cases of teacher-made tests in real school settings had helped the student teachers build their capacity to communicate about the case with the teachers. However, referring to the strong agreement perception, teamwork received the highest percentage of agreement with 55% strong agreement, cognitive skills were found with 41.67% strong agreement, whereas critical thinking skills and communication skills were at 35% strong agreement. Interestingly, the present study revealed that engagement had the smallest percentage of agreement, i.e., 72.5% agreement. In the present study, CBL did not evidence to facilitate the student teachers'

involvement in the learning activities. Besides, 22.50% of the student teachers disagree that CBL strengthens their communication skills to speak in front of the public. In other words, the findings of the present study revealed that cognitive, critical thinking and communication skills were learning skills that amenably functioned in the implementation of CBL. Table 1 described the learning skills perceived functioned in the implementation of CBL.

Table 1. Learning skills on the implementation of CBL

Learning Principles	Perceptions of CBL (%)			
	strongly Agree	agree	disagree	strongly Disagree
Cognitive	41.67	46.67	11.67	0
Critical Thinking	35	53.33	11.67	0
Engagement	27.50	45	22.50	0
Communication Skills	35	50	15	0
Teamwork	55	25	20	0

The Learning Skills of The Student-Teachers Functioned in The Implementation of The Project-Based Learning (PjBL)

The findings presented in Table 2 indicated that engagement had the highest percentage of strong agreement among others. It was perceived as the fruitful effect of the implementation of PjBL. Total agreement at 87.5% showed that most of the student teachers agreed with the statement that PjBL increased their engagement and interest in learning about language assessment. Unlike CBL, in which engagement was found as the least agreed to learn skill functioned, the student teachers believed that PjBL had facilitated them to engage in learning more. The second highest agreement was found in cognitive with a total number of agreements was 85%. This was parallel to what was found in CBL, that the student teachers felt they had a deeper and more comprehensive understanding of language assessment,

particularly in developing items for a teacher-made test. Only 50% of agreement that doing the project in a group strengthen their communication skills to speak before an audience. The findings suggested that the student teachers believe that PjBL facilitated learning engagement, promoted a deeper and more thorough knowledge, and strengthen their communication skills.

Table 2. Learning skills on the implementation of PjBL

Learning Principles	Perceptions on PjBL(%)			
	Strongly Agree	Agree	Disagree	Strongly Disagree
Cognitive	26.67	58.33	7.67	0
Critical Thinking	35	48.23	16.67	0
Engagement	37.50	50	10	2.50
Communication Skills	25	25	50	25
Teamwork	10	50	40	10

Statistically Significant Differences between The Learning Skills of the Student-Teachers Functioned in The Implementation of The CBL and The PJBL Model

The result of the paired-sample t-test aimed to determine if there was a statistically significant difference in the student teachers' learning skills after implementing CBL and PjBL. The univariate descriptive statistics (see Table 3) showed that the means of learning skills of the student teachers treated using CBL was 42.25, and the learning skills of the student teachers implementing PjBL was 42.15. Descriptively there were slightly different points between the two means. However, Table 4 showed that the statistical test obtained .912 Sig (2-tailed). In this case, the hypothesis cannot be rejected, since the obtained Sig. (2-tailed) was bigger than (.05) Thus, it can be concluded that there was no statistically significant difference between the learning skills of the student teachers who were treated with CBL and those who were treated with PjBL.

Table 3. The univariate descriptive statistics of the learning skills

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	CBL	42.25	20	4.506	1.008
	PjBL	42.15	20	4.671	1.044

Table 4. The paired-samples t-test of the learning skills

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	Df	Sig. (2-tailed)
Pair 1	CBL - PjBL	.100	3.972	.888	-1.759	1.959	.113	19	.912

From this finding, it can be assumed that implementing CBL and PjBL did not contribute different learning skills to the EFL student teachers in the Language Assessment course.

DISCUSSION

The results of this study showed that using CBL cognitive, critical thinking, and communication skills were perceived as three of the five learning skills that had a favorable impact. CBL is a learning model which allows the student teachers to learn by solving real-world situations. CBL offered opportunities for students to work on actual issues and identify solutions (Gregory & Champman, 2013). The student teachers acquire problem-solving skills via exposure to the problems. If learning is regularly connected to real-world issues outside the classroom, students' critical thinking and method of thinking will improve. The finding also supported (Hapsari & Kuswandono, 2020) noting that the student-teachers develop the knowledge to solve problems and develop solutions through problems from real life. Daily problems used as a learning topic provide students

exposure and let them practice problem-solving. Through experiential learning, learners may link what they already know to what they learn. As a result, learning involved applying acquired information critically as well as learning at a cognitive level. The findings of the present study confirmed a study by Darling-Hammond et al., (2020) that to develop a more integrated and sophisticated teaching model during their teacher education, students must have the chance to participate in the reality of teaching.

Besides, the findings of the present study revealed that communication skills as perceived impacted skills of the implementation of CBL. The student teachers obtained this through solving the problems as well as communicating the problems with others. Accordingly, Nkhoma et al. (2017) and Topperzer et al. (2022) noted that case studies provide students with a depiction of a situation in the actual world when an individual or group inside an organization must make decisions and discuss alternatives. The present study is also in line with Vogler et al. (2018) mentioning how case-based learning allows them to exhibit both hard and soft skills to some extent. The findings showed communication skills functioned in CBL probably because the students are encouraged to contribute thoughts or opinions by discussing the cases. These findings were not in contrast with Kodariyati & Astuti's (2016) that case-based discussions allow students to express ideas or thoughts.

Regarding the implementation of PjBL, the present study was consistent with (Turner & Theilking, 2019)T findings that PjBL strengthens the students' learning engagement, and critical thinking skills and provides meaningful learning. Through PjBL the student teachers were encouraged to actively participate in the completion of the project; beginning with planning and ending with evaluating project accomplishments. PjBL places the student teachers at the center of the learning process. They are given the authority to choose what and how they will study. The finding showed that the student teachers felt more engaged in the implementation of PjBL. This conformed with Ameta's et al. (2020) opinion that asking questions at the early stages of

a project fostered involvement from the students. It was noticeable that several PjBL activities had promoted student participation.

Cognitive and critical thinking were two other components found functioned by the student-teachers to be the upshot of PjBL. Grounding on constructivism, PjBL emphasizes mental growth and attention since the students are not treated as blank slates throughout PBL interaction. It involves personal study, learning, and knowledge construction. The results of the present study confirmed Fernandes' (2014) and Shin's (2018)findings that PjBL promotes deep learning and crucial professional practice abilities since the project's development offers a real-world framework for connecting theory to practice. PjBL helped students with motivation, articulating theory and practice, problem-solving, and cooperation. They also showed that PjBL was perceived as improving student teachers' critical thinking. In line with (Abuhmaid, 2020) the findings, in general, suggested that the student teachers showed a positive attitude toward the implementation of PjBL.

The findings suggested that using CBL and PjBL the student teachers did not have a different attitude toward the five learning skills, cognitive, critical thinking, engagement, communication, and teamwork. However, the student teachers showed a positive attitude toward the implementation of CBL and PjBL. As student-centered learning models, the two models were perceived to bring an effect on several components of learning skills. This can be assumed that each model probably places each component of the learning skills differently. However, the present study did not investigate the difference between each learning component.

It was suggested that opportunities be provided for student teachers to participate in authentic problem-solving and knowledge development in appropriate professional settings. Both CBL and PjBL were evidenced for the improvement of cognitive and soft skills of the student-teachers. Thus, the present study confirmed that KM, as a part of teaching assistance program of *MBKM,* has offered opportunities for the student-teachers to learn and develop themselves through activities

outside the classroom. Both learning models give the students adequate time to study essential materials in-depth, such as language assessments, and apply the fundamental learning skills.

CONCLUSION

Even though statistically there was no difference between the use of CBL and PjBL toward learning skills of the student teachers, each learning model descriptively showed that there were somehow some learning skills perceived as the upshots of the implementation of each learning model. In a nutshell, the study's findings about the learning skills that functioned in the implementation of CBL included cognitive, critical thinking, and communication skills, whereas, *in PjBL* learning engagement, cognitive, and communication skills to function. These skills serve as the foundation for learning that is beneficial. Besides, the present indicated that both CBL and PjBL allowed the students to apply their coursework to more general professional contexts outside of the academic environment. As teaching itself is a lifelong learning profession, the skills are essential for the student-teaches. Therefore, teacher education institutions need to urge the implementation of these learning models.

This present study may have some limitations, such as the length of the treatments and the small sample size. Thus, it is strongly advised that future researchers take responsibility to conduct more thorough research on the learning models. Besides, Future researchers should pay consideration to the sample size to enable a more thorough investigation.

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