

# Effect of Project-Based Learning and Self-Efficacy on Teacher Identity

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**Abstract:** Professional teachers with strong teacher identities will influence the perspectives, goals, and decisions that greatly impact students' achievement. However, prospective teachers are in the early stages of their careers, developing their identity as they gain new experiences and develop self-efficacy in teaching. This issue may require further attention due to the considerable influence of existing challenges on future educators. Hence, this study aims to determine the impact of project-based learning (PjBL) and self-efficacy on teacher identity from prospective teachers. This research was conducted on prospective elementary school teachers at one of the North Sulawesi Universities, Indonesia, with a quasi-experimental research design. The experimental group used project-based learning, and the control group used traditional methods. Data on “teacher identity” as a dependent variable and “self-efficacy” as a moderator variable were collected using a 5-point Likert scale questionnaire and analyzed using a two-way ANOVA. The findings of this study are as follows: (1) The development of teacher identity of prospective teachers who study with project-based learning was higher than that of traditional methods. (2) There was an interaction between learning methods and self-efficacy. (3) The development of teacher identity of prospective teachers in project-based learning with high self-efficacy was higher than those in the control group, which used traditional methods. (4) The development of teacher identity of prospective teachers in traditional methods with low self-efficacy is higher than in project-based learning. Therefore, it is concluded that the self-efficacy of prospective teachers plays a role in developing the teacher identity of prospective teachers in project-based learning and traditional methods.

**Keywords:** Project-based learning, Self-efficacy, Teacher identity

## 1. Introduction

Quality education is supported by human resources, including professional teachers. Teacher education in higher education institutions serves as a platform to equip prospective teachers with theoretical knowledge and practical teaching skills necessary for becoming professional teachers in the future (Fabriz et al., 2021). Professional teachers with a strong teacher identity influence their perspectives, goals, and decision-making processes (Beijaard & Meijer, 2017). Teacher identity is a

mental construction that develops from experience, values, beliefs, and knowledge about a teacher personally. Teacher identity includes self-reflection that contains questions about a teacher, oriented to student success and the future of learning in schools (Lutovac, 2020; van Lankveld et al., 2017). The development of teacher identity greatly helps prospective teachers to deepen individual and collective abilities to improve the professionalism and quality of learning in students in the classroom, such as teaching methods, interaction with students and peers, as well as involvement in learning activities and career development (Malm, 2020; Noonan, 2019; Snoek, 2021). Teacher identity development includes a variety of concepts regarding what is essential in teaching, underlying values, and expectations of oneself as a teacher (Vermunt et al., 2017; Woods, 2021).

The development of teacher identity has faced several challenges for prospective teachers enrolled in teacher education programs at higher education institutions. These obstacles include ethical implications, uncontrolled emotions, and attitudes toward responding to unexpected situations and conditions (Granjo et al., 2021; Pishghadam et al., 2022). Additionally, prospective teachers often experience lower motivation to develop the competencies needed to become professional teachers (Jentsch & König, 2022). Furthermore, difficulties in committing to a teaching career and a lack of confidence in their ability to succeed as teachers, combined with insufficient teaching experience, hinder the development of their teacher identity (Flores, 2020).

In the learning process for prospective teachers, lecturers must understand teacher identity development according to their self-efficacy level. Each prospective teacher has different competencies, experiences, physiological states, and emotions when responding to situations and learning processes. Prospective teachers with high self-efficacy tend to be more confident and effective in teaching practice (Gale et al., 2021). Self-efficacy can increase commitment to the teaching profession and motivate us to study and develop teaching skills actively. In addition, self-efficacy affects perceptions of teachers' roles and duties and strengthens self-confidence to face challenges and obstacles in the learning process (Lendínez Muñoz et al., 2023). Understanding the level of self-efficacy of prospective teachers has an impact on the development of teacher identity.

Furthermore, the development of teacher identity must be progressive and is closely tied to sustained teaching practice experience (Chu, 2021). Within teacher education programs, authentic teaching practice plays a pivotal role in shaping how prospective teachers perceive and construct their professional roles. One effective approach to facilitate this is project-based learning, which immerses prospective teachers in school-based projects that bridge theoretical coursework with real classroom implementation (Kula & Güler, 2021). Project-based learning fosters autonomy, increases motivation, and creates meaningful learning experiences (Ngereja et al., 2020; Stanley, 2021). More importantly, it provides opportunities for prospective teachers to directly engage in classroom instruction, thereby strengthening their teaching competence and reflective practice.

The development of teacher identity has become a critical discussion and has been widely researched in the field of teachers and learning. Longitudinal phenomenological case research shows teacher identity's role in increasing prospective teachers' self-efficacy (Marschall, 2021). Narrative research on the experience of experiencing failure in the learning process as a prospective teacher affects the development of teacher identity (Lutovac & Assunção Flores, 2021). Quantitative research with classroom observation found that teachers in professional development programs, through practical teaching experience with project-based learning, can also apply project-based learning in their classroom learning. Students are actively involved in learning projects in the classroom (Farrow et al., 2022). Qualitative research with linguistic analysis found that prospective teachers participating in online project-based learning affect professional identity development (hutz & Muchnik-Rozanov, 2023). In contrast to some of the studies conducted, this quasi-experimental research was carried out by applying project-based learning in the experimental group and traditional methods in the control group. This research focuses on developing teacher identity through project-based learning, which is predicted with self-efficacy in prospective teachers.

Therefore, this study aims to determine the effect of project-based learning on teacher identity, with self-efficacy as the predictor of prospective teachers. Higher education lecturers must design innovative learning methods for prospective teachers that can improve academic achievement while affecting the development of their teacher identity. One such method is implementing project-based learning.

## **2. Literature Review**

### **Teacher Identity**

Teacher identity is the beliefs and values regarding the function and role of teachers in shaping students' lives (Schutz et al., 2020; Pishghadam et al., 2022). Teacher identity can be developed through reflection on teaching experiences and perceptions of how teachers should act through social interaction with students, peers, and the school environment (Beijaard & Meijer, 2017; Flores, 2020). Developing teacher identity requires individual efforts to define themselves as teachers and be recognized by others. A teacher must have empathy for students, the ability to implement ideas, mastery of learning methods, and the ability to deal with difficult situations ethically with understanding and tolerance (Aldrup et al., 2022).

Teacher identity development is related to psychological processes, namely appreciation, connectedness, competence, commitment, and future career aspirations (van Lankveld et al., 2017). Teacher identity development is a continuous process of repeated interpretation of how teachers or prospective teachers think about themselves, how others feel about themselves, and what they want from them. The development of teacher identity is very complex and built in a dynamic socio-cultural context (Kavrayção, 2020; Lutovac & Assunção Flores, 2021). Teacher identity development includes aspects such as self-image, the influence of the social environment, and patterns that change and continue over time. Furthermore, commitment, motivation, and teachers' perceptions of their roles play a significant part in developing teacher identity (Hanna et al., 2019; Suarez & McGrath, 2022). This research will focus on aspects of self-image, commitment, motivation, and teacher's perceptions to develop prospective teachers' identities.

Therefore, in the context of teacher education in higher education institutions, it is very important to develop the teacher identity of prospective teachers. This ensures that they understand the roles and responsibilities of a teacher and develop an appropriate perception of the teaching profession. Additionally, prospective teachers will be better prepared to face various challenges in the learning process with students through self-reflection and teaching practice experiences integrated with the educational theories they learn (Seyri & Nazari, 2023; Tatto, 2021).

Moreover, self-efficacy refers to belief in one's ability to regulate independent and flexible learning, which motivates academic success through the learning process in higher education (Schunk & DiBenedetto, 2021; Talosa et al., 2024). A person with high self-efficacy can be actively involved in academic tasks that impact learning outcomes (Tomás et al., 2020). According to Bandura, four primary sources of self-efficacy: 1) Mastery experiences; 2) Vicarious experience; 3) Social and verbal persuasion; and 4) Physiological and affective states (Urdu & Pajares, 2005). Self-efficacy is important in regulating an individual's behavior, emotions, and cognitive processes. Prospective teachers with high self-efficacy have confidence in their ability to become professional teachers and are confident in facing the challenges of learning dynamics in the classroom. In addition, they can interact socially with students, peers, parents, and the school environment. Prospective teachers who have high self-efficacy have an impact on the development of a good teacher identity. On the other hand, prospective teachers who have low self-efficacy are less confident in their ability to teach, lack confidence, often feel anxious, and have difficulty facing challenges in teaching in certain situations (Pearman et al., 2021; Wang et al., 2023).

### **Project-Based Learning in Teacher Education**

Project-based learning is a method to solve a complex project based on questions or problems (Aldabbus, 2018). The project that will be carried out in this study is to conduct teaching practices on students in elementary schools. Prospective teachers work independently and are responsible for working on teaching practice projects within a certain period. Determine the best way to complete the project, determine the time allocation, prepare learning tools, conduct teaching practice exercises, and implement them on students in the classroom ((Wahid et al., 2020; Stanley, 2021). Furthermore, project-based learning involves prospective teachers in real-world projects, creating their own meaning and interacting with lecturers in real-time, which increases motivation, higher-order thinking, and problem-

solving skills. It also prepares them for campus-based learning, professional careers, and broader community engagement while enhancing lecturers' satisfaction through more meaningful teaching processes (Hawari & Noor, 2020). The teaching practice projects are carried out, helping prospective teachers to learn in real-world contexts and helping them prepare for challenges on campus and future careers (Rohm et al., 2021).

Project-based learning applied in higher education is very effective in providing more tangible and practical experiences, carrying out constructive activities, developing competencies, and creating a flexible learning environment (Guo et al., 2020; Parrado-Martínez & Sánchez-Andújar, 2020). In the learning process, prospective teachers can interact and collaborate with peers to build and develop their knowledge and engage in new learning processes to create knowledge that is quite challenging for prospective teachers individually (Markula & Aksela, 2022; Žerovnik & Nancovska Šerbec, 2021). The collaborative learning process enhances social and communication skills through teamwork, enabling prospective teachers to share ideas, articulate arguments, and accept constructive feedback, thereby enhancing interpersonal abilities, making it a prominent characteristic of project-based learning (Melguizo-Garín et al., 2022; Rofik, 2022).

Furthermore, in teacher education at higher education institutions, project-based learning serves as a bridge between theory and practice (Korkmaz & Kalayci, 2021). By actively engaging prospective teachers in direct teaching practice with elementary school students, they can integrate theoretical knowledge, subject matter, and pedagogical skills, which contribute to the development of their teacher identity. Through project-based learning, prospective teachers gain authentic and reflective experiences that strengthen their awareness of professional responsibilities, enhance their motivation and commitment to building teaching competencies, and deepen their understanding of their roles as future professional teachers (Farrow et al., 2022; Tsybulsky & Muchnik-Rozanov, 2023).

### **3. Research Methodology**

This study uses quantitative and quasi-experimental methods, with sampling and determination of experimental and control groups not randomly but using natural research groups (Creswell & Creswell, 2017). The quasi-experimental research used a 2 x 2 treatment by level design, with variable, independent project-based learning and traditional methods, variable dependent teacher identity, and variable moderator self-efficacy. The research was conducted in one of the Elementary School Teacher Education Study Programs in North Sulawesi, Indonesia. The research population is all prospective teachers, totalling 1749 people, and focuses on population characteristics and research objectives (Barragán-Landy et al., 2020).

The sampling technique is determined by purposive sampling, ensuring the sample is homogeneous (Douglas, 2022). The research sample consisted of 68 prospective teachers in the Elementary Mathematics Education course, and it was divided into an experimental group and a control group. The experimental group learned by applying project-based learning and control classes with traditional methods. Before the implementation of the treatment in the experimental group and control group, a discussion was held to equalize perception with the lecturer who will teach related to the steps of project-based learning and traditional methods, as well as the assessment to be carried out. Prospective teachers are given information about the learning process's goals and expectations. The research was conducted in 8 sessions, each lasting 150 minutes.

**Table 1**

*Treatment for Experimental Groups and Control Groups in Teacher Identity Development*

Session	Experimental Group	Control Group
1-2	Prospective teachers analyze phenomena and problems related to the mathematics learning process in elementary school.	The lecturer explains phenomena and problems related to the mathematics learning process in elementary school.
3	Prospective teachers observe and analyze the learning process mathematics in elementary school	Prospective teachers observe example of the process of learning mathematics in elementary school through video views given
4	Prospective teachers discuss teaching practice assignments and projects that will be carried out in elementary schools, prepare materials and learning tools, and do so. Practice Teaching with friends	Prospective teachers prepare materials and make teaching tools that will be used in teaching simulations.
5-6	Prospective teachers implement the project by practicing teaching to elementary school students. Lecturers and classroom teachers monitor activities.	Prospective teachers conduct teaching simulations according to the lecturer's arrangement.
7	Prospective teacher present experience practice teaching, discussion, and reflection	Class discussions
8	Teacher identity developmenttest (5-point Likert scale questionnaire)	Teacher identity development test (5-point Likert scale questionnaire)

The project-based learning and traditional methods are associated with teacher identity development for prospective teachers. Teaching practice projects for experiment groups were carried out with elementary school students, while teaching simulations using traditional methods were conducted in the classroom with peers. A 5-point Likert scale questionnaire collected teacher identity and self-efficacy data. The teacher identity test is given to prospective teachers after practice sessions and teaching simulations are completed. Components of the teacher's identity include self-image, motivation, commitment, and perceptions of the teacher's roles. It consisted of 40 items; the instrument's validity with the correlation of Pearson's product moment was obtained with a constructed value between 0.379 and 0.763, with 38 valid items and two items revised. Furthermore, Alpha Cronbach's reliability score was included in the "good" category, obtaining a score of 0.933. Teacher Identity of prospective teachers in this study was observed before and after the study, while self-efficacy played a role in the predictors

Self-efficacy questionnaires were given before teaching practice and simulation. Self-efficacy is used to qualify students for high and low self-efficacy. Test scores were sorted from highest to lowest score then 27% of the highest scores were taken from the category of prospective teachers who had high self-efficacy, and 27% of the lowest scores were taken from the category of prospective teachers who had low self-efficacy (Kelley, n.d.; Ng, O et al., 2020). The components of self-efficacy include mastery of performance, experience, social and verbal persuasion, and physiological and affective states. The self-efficacy instrument consisted of 40 items; 39 items were considered valid, and 1 item was revised, with Pearson's product-moment correlation value between 0.431 and 0.761. The reliability test results through Alpha Cronbach obtained a score of 0.942 with the category of "good." Subsequently, the data

were analyzed descriptively and statistically using two-way ANOVA and Post hoc Tukey test with the JASP 0.18.3.0 application.

#### 4. Research Results

The data on self-efficacy and teacher identity of prospective teachers are as follows:

**Table 2**

*Descriptive Statistics*

	Self- efficacy	Mean of Teacher Identity Score	SD	N
Experiment	High	91.33	4.472	9
	Low	71.50	9.040	9
	Total	88.48	7.241	34
Control	High	71.44	6.948	9
	Low	81.44	7.858	9
	Total	76.15	6.871	34

Table 2 describes the data's characteristics regarding prospective teachers' responses to the development of teacher identity. In the experimental group, prospective teachers had high self-efficacy (M=91.33; SD=4.472), indicating that teacher identity development is higher than prospective teachers with low self-efficacy (M=71.50; SD=9.040) on the other hand, in the control group, prospective teachers who had low self-efficacy (M=81.44; SD=7.858), indicating that the development of teacher identity is better compared to prospective teachers with high self-efficacy (M=71.44; SD=6.948).

**Table 3**

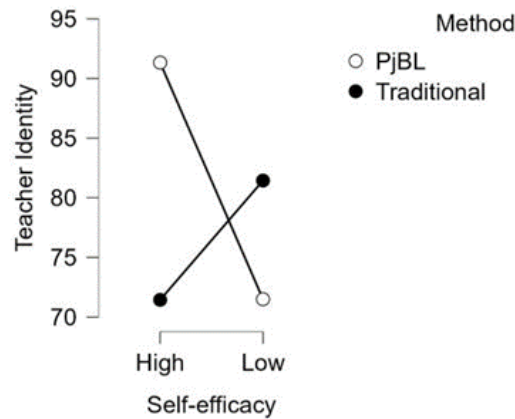
*Two-way ANOVA*

Cases	Sum of Squares	Df	Mean Square	F	p
Method	210.970	1	210.970	4.307	0.046
Self-efficacy	215.764	1	215.764	4.405	0.044
Method * Self-efficacy	1941.879	1	1941.879	39.645	<.001
Residuals	1518.444	31	48.982		

Table 3 shows that based on the learning method, there is a statistically significant difference in teacher identity between project-based learning and traditional methods (F=4,307, p- value=0.046). This shows that project-based learning contributes to developing teacher identity for prospective teachers. In addition, there was a significant difference in teacher identity based on prospective teachers' self-efficacy level (F=4,405, p-value=0.044). The interaction between learning methods and self-efficacy (F=39,645, p-value= <0.01).

**Figure 1**

*Descriptives Plot*



Prospective teachers with high self-efficacy in the experimental group develop their teacher identity better. Meanwhile, prospective teachers with low self-efficacy in the control group also show good teacher identity development. Furthermore, Tukey's test determines prospective teachers' identity differences (Table 4).

**Table 4**

*Tukey Test*

		Mean Difference	ONE	t	ptukey
PjBL High	Traditional High	19.833	3.401	5.832	<.001
	PjBL Low	19.889	3.299	6.028	<.001
	Traditional Low	9.889	3.299	2.997	0.026
Traditional High	PjBL Low	0.056	3.401	0.016	1.000
	Traditional Low	-9.944	3.401	-2.924	0.031
PjBL Low	Traditional Low	-10.000	3.299	-3.031	0.024

There was a significant difference in teacher identity between prospective teachers with high self-efficacy, who learned with project-based learning, and traditional methods ( $t=5.832$ ;  $p<0.001$ ). This shows that prospective teachers with high self-efficacy are more suitable for learning with project-based learning than traditional methods. On the contrary, there was a significant difference in teacher identity between prospective teachers with low self-efficacy who learned with project-based learning and traditional methods ( $F=3.031$ ,  $p=0.024$ ). Prospective teachers with low self-efficacy have better teacher identity development through traditional methods than project-based learning.

## 5. Discussion

### 5.1 The development of teacher identity in prospective teachers learning through project-based learning is higher compared to those using traditional methods

Based on the results of statistical analysis with two-way ANOVA, it was found that there was a significant difference in teacher identity development between prospective teachers who studied

project-based learning and traditional methods. The development of teacher identity for prospective teachers who learn with project-based learning is higher than traditional methods. These findings provide information that the application of project-based learning can improve the identity of prospective teachers. They are more motivated and committed to equipping themselves as professional teachers. In addition, the perspective of prospective teachers regarding professional self-image and social self-image, confidence in their ability to teach according to student characteristics, and team collaboration have increased. Observation activities of the mathematics learning process in elementary school, project planning, and implementing direct teaching practices by students in elementary school stimulate the development of teacher identity. This aligns with (Tsybulsky Muchnik-Rozanov, 2019) that teaching practice provides meaningful experiences through collaboration with peers in project-based learning. Teaching practice experience by interacting directly with students helps to get to know the conditions and situations of learning in schools (Hernández-Barco et al., 2021), which has an impact on the self-image, motivation, commitment, and perceptions of teacher's roles of prospective teachers (Hahl & Mikulec, 2018). Teaching practices make prospective teachers more confident and ready to manage the classroom and provide students with a teaching experience that strengthens their confidence in their abilities, as well as provides insight into the roles and responsibilities of teachers (Amerstorfer & Freiin von Münster-Kistner, 2021).

However, teacher identity development is in the low category in traditional methods. The learning process lacks stimulants for prospective teachers in cognitive, social, and emotional processes (Ghafoor & Rabaia, 2022). Teaching simulations only involve lecturers and peers and do not interact directly with students. Mainhard et al. (2022) stated that prospective teachers who only conduct teaching simulations do not have the opportunity to interact with students. As a result, there is a lack of awareness of the environment, situations, and conditions at school and a lack of emotional closeness with students. In addition, prospective teachers think that teaching simulations are limited to the demands of academic assignments, so they ignore the right learning strategies and methods.

## **5.2 There is an interaction between learning methods and self-efficacy**

The study's findings show that prospective teachers with high self-efficacy who learn with project-based learning have the confidence to prepare themselves to become professional teachers. Prospective teachers have the right self-perception regarding assessing their abilities to contribute to students in classroom learning. In addition, prospective teachers are motivated to become teachers because of the support of lecturers, classroom teachers, and peers through teaching practice experience, and they are committed to developing their abilities as teachers and future leaders. This finding aligns with (King & Smith, 2020), who states that developing the teaching profession with good leadership can be improved through project-based learning. Teaching practice experience helps prospective teachers create a vision as a leader in the classroom, contributing to the quality of learning in the school.

Furthermore, the study's findings show that the perception of prospective teachers needs to be more appropriate regarding their abilities and goals to become teachers. This is demonstrated by prospective teachers with low self-efficacy and learning with project-based learning. Teaching practice experience makes prospective teachers feel uncomfortable. Prospective teachers have the perception that the teaching profession is challenging for them. Prospective teachers also consider themselves to lack the confidence to become teachers, are anxious and lack confidence when appearing in front of the class and are not familiar with the school environment. Hußner et al. (2023) found that direct experience teaching prospective teachers can initially cause anxiety and lack of confidence. Prospective teachers consider the teaching profession challenging.

On the contrary, the study's findings show that the development of teacher identity is low in the aspect of the professional self-image of prospective teachers. This is demonstrated by prospective teachers with high self-efficacy who learn with traditional methods. The learning process controlled by lecturers through the delivery of information in front of the classroom needs to include the characteristics of prospective teachers with high self-efficacy. As a result, prospective teachers feel bored and less motivated to learn, have fewer opportunities to explore teaching knowledge and skills, are less enthusiastic about preparing themselves to manage the classroom and have a low perception of teachers' roles, duties, and responsibilities. In line with (Doo & Bonk, 2020), prospective teachers with



high self-efficacy are less interested in traditional methods and emphasize receiving information from lecturers. They tend to be more motivated to learn, providing opportunities to explore knowledge and skills actively. Prospective teachers feel they need more creativity and independent skills. As a result, prospective teachers consider the assigned tasks to fulfill academic demands.

Furthermore, research findings on prospective teachers who have low self-efficacy and learn with traditional methods show that they are motivated to develop professionalism with confidence in their ability to become teachers. Traditional methods can facilitate their study because explicit lecturers' explanations make it easy for them to understand the material. Prospective teachers feel motivated and confident in their abilities because they have the support of lecturers. In teaching simulation activities, prospective teachers can overcome anxiety by appearing in front of the class because they have the support of lecturers and peers. The findings of (Cansiz & Cansiz, 2019) explain that prospective teachers who have low self-efficacy have high anxiety, fear, or stress. The proper learning process for them is through traditional methods. So, lecturers need to understand prospective teachers' fears and anxieties about constructivist learning. Furthermore, according to Simsek and Yazar (2019), prospective teachers with low self-efficacy are more comfortable with traditional methods due to a lack of teaching experience, skills, and support in constructivist learning.

### **5.3 The development of teacher identity among prospective teachers with high self-efficacy is higher when they learn through project-based learning compared to traditional methods**

The findings of the research result on prospective teachers who have high self-efficacy and learn with problem-based learning show a strengthening of perception regarding confidence in one's ability to become a professional teacher, motivation, and commitment to hone knowledge and skills related to the development of teacher identity. Teaching practice experiences are fun and provide opportunities for positive reflection related to the role and responsibility of teachers in the learning process. Prospective teachers can interact with students and learn about classroom conditions and student characteristics. According to Buechel et al. (2024) prospective teachers with high self-efficacy are better able to develop their self-confidence in becoming professional teachers, motivate themselves to develop their teaching knowledge and skills, and demonstrate greater commitment to completing assignments. Moreover, teaching practice experiences reinforce their understanding of the development of their teacher identity.

On the contrary, it was found that there was a low development of teacher identity in prospective teachers who had high self-efficacy and learned with traditional methods. Prospective teachers tend to feel bored and less motivated to learn because they do not get the opportunity to explore the knowledge and teaching skills they have. Similarly, Menon (2020) stated that prospective teachers with high self-efficacy are less motivated by traditional methods due to the limited opportunities to explore knowledge and skills through direct practice. Therefore, prospective teachers with high self-efficacy require practical teaching experiences in real classroom settings to develop their teacher identity.

### **5.4 The development of teacher identity among prospective teachers with low self-efficacy is lower when learning through project-based learning compared to traditional methods**

The study's findings show that teacher identity development could be less optimal among prospective teachers with low self-efficacy who learn through project-based learning. Prospective teachers are less motivated to equip themselves in organizing learning activities, lack confidence, and have difficulty collaborating in planning, organizing, and carrying out the learning process. Evaluation and reflection activities make them less comfortable and anxious, especially if they face criticism for work results considered less than optimal. The experience of teaching practice became an unpleasant experience and viewed that becoming a teacher was not easy for them. According to Buechel et al. (2024), prospective teachers with low self-efficacy tend to lack confidence in their abilities and struggle with evaluation and reflection. Teaching practice experiences in elementary schools are perceived as challenging, which hinders the development of their teacher identity.

On the other hand, good teacher identity development is found in prospective teachers who have low self-efficacy and learn with traditional methods. Prospective teachers are motivated to equip

themselves with the ability to organize learning activities, with awareness of their goal of becoming teachers. Learning activities through explicit explanations by lecturers and teaching simulations with the direction of lecturers cause prospective teachers to feel comfortable and receive support from lecturers to guide them in the learning process. According to Cansiz & Cansiz (2019), prospective teachers who have low self-efficacy have high anxiety, fear, or stress. The proper learning process for them is through traditional methods. Lecturers must understand prospective teachers' fears and anxieties and guide and support them.

## **6. Conclusion**

Based on the findings of this study, it can be concluded that the application of project-based learning impacts the development of prospective teachers' identities. Project-based learning facilitates prospective teachers' learning needs, increasing motivation, learning activity, independence, and cooperation. In line with that, implementing project-based learning through teaching practice projects in schools contributes to the development of the teacher identity of prospective teachers, including aspects of self-image, motivation, commitment, and self-efficacy. Furthermore, this study states that self-efficacy affects the development of the identity of prospective teachers. Self-efficacy is related to motivation to learn and do academic tasks, confidence, and collaboration skills that affect the development of the teacher identity of prospective teachers. Although the development of teacher identity among prospective teachers with low self-efficacy shows lower results, the overall average score for the development of teacher identity is still higher for those learning through project-based learning. This indicates that project-based learning has an advantage in supporting the overall development of teacher identity, even though it may be less optimal for prospective teachers with low self-efficacy. The findings of this study emphasize the importance of implementing project-based learning in developing teacher identity for prospective teachers. Additionally, it highlights the benefits of project-based learning for lecturers to consider in the learning process within teacher education at higher education institutions. This study has limitations because it only focuses on proving the effect of project-based learning on teacher identity from the self-efficacy of prospective teachers. The research sample was limited according to prospective teachers' self-efficacy level, and only a 5-point Likert scale questionnaire instrument was used. Therefore, future research can develop a more comprehensive research sample with varied instruments according to alternative relevant research types.

## **7. Co-Author Contribution**

The authors affirmed that there is no conflict of interest in this article. Author 1 carried out the fieldwork, prepared the literature review, and overlooked the write-up of the whole article. Author 3 wrote the research methodology and did the data entry. Author 2 carried out the statistical analysis and interpretation of the results.

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