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Empowering the Practice-Based Mentoring in Microteaching on Pre-Service ICT Teachers: High and Low Self-Efficacy Analysis

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Abstract

Practice-based microteaching is now an important method in pre-service teacher education, particularly in ICT, as it creates a forum to practice teaching skills in a structured setting. However, the success of this depends greatly on the quality of guidance, which has the capacity to deliver timely and critical feedback. Self-efficacy, being the belief that an individual is capable of completing tasks, has been a significant predictor of learning achievement and motivation. The present research aims to examine the pre-service ICT teachers' learning achievement and the learning motivation of high and low self-efficacy individuals within a practice-based microteaching environment supported by mentoring. In experimental design, the subjects (N = 82) were divided into high and low self-efficacy according to a standardized self-efficacy scale. The data analysis in this study employed the t-test and Analysis of Covariance (ANCOVA). The findings of this study indicated there was no difference in learning achievement between the two groups on practice-based mentoring in microteaching for pre-service ICT teachers. Moreover, in intrinsic motivation, it was found that high self-efficacy practice-based mentoring microteaching students have significantly higher intrinsic motivation than low self-efficacy students. In the present study, however, low self-efficacy students for practice-based mentoring microteaching show significantly greater extrinsic motivation than high self-efficacy students. This research offers additional reference to scholars, teachers, and policymakers in investigating the role of self-efficacy in learning activity, learners' accomplishment in learning, and to supporting SDGs 4 and 5 in promoting the quality of education as well as gender equality.

Keywords: Microteaching, Self-Efficacy, Pre-Service Teacher, Mentor, Motivation
SDGs: Goal 4 (Quality Education), Goal 5 (Gender Equality)

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INTRODUCTION

The training of aspiring teachers, especially aspiring ICT teachers, has increasingly relied on practice-oriented microteaching in recent decades (Cavanaugh, 2022; O'Flaherty et al., 2023; Zhang & Cheng, 2011). In order to promote reflective practice and quick skill development, microteaching is a technique for skill improvement in which trainees conduct quick sessions under supervision and receive organized, helpful feedback (Remesh, 2013). In a recurring cycle, this concept allows aspiring educators to hone their teaching abilities on a modest scale, evaluate their performance, and get feedback from mentors or peers (Keiler et al., 2023). Better lesson preparation abilities, classroom management, and instructional communication in a supervised setting are among the advantages. But there are other difficulties as well, such a lack of mentors

who can offer helpful criticism, a lack of facilities, and a lack of preparation time. In order to optimize the efficacy of practice-based learning, these circumstances highlight the vital requirement for qualified mentors (James et al., 2022; Mokoena & van Tonder, 2024).

Due to their ability to give instant, focused feedback, mentors played a critical role in microteaching, allowing aspiring teachers to rapidly enhance their methods (Brinia & Psoni, 2018). Prior research has revealed the important role of mentors in learning accomplishment and learning motivation (Tutyandari et al., 2023; Yerdelen et al., 2019). Shahat et al. (2025) have observed that video-based microteaching had a significant impact on the teaching self-efficacy of prospective teachers, and it can improve their dimensions pertaining to instructional strategy, classroom management, and student engagement. And research on e-mentoring for EFL teacher trainees in Egypt, too, confirmed that remote mentoring is effective at increasing participants' self-efficacy and emotional intelligence (Elsayed, 2021). In addition, studies on mentor training reveal that improvements in the competence of mentors lead to a better provision of feedback and result in higher motivation and better learning results see (De-Lacalle & Soenke, 2024; Ramandani et al., 2024).

Learning success is influenced by some internal elements, including student self-efficacy, in addition to the function of mentors. Self-efficacy is the conviction that one can accomplish a task or reach a particular objective (Bandura, 1997; Uye & Olapegba, 2025). High self-efficacy people typically approach obstacles with greater self-assurance, tenacity, and drive, increasing their chances of achieving the best possible learning results (Bandura, 2023). On the other hand, those who have poor self-efficacy are less likely to be confident, give up easily, and be motivated to learn. This perspective is supported by Shahat et al.'s (2025) findings, which demonstrate that effective microteaching interventions can raise self-efficacy, which can then encourage learning motivation and achievement.

Yet, there are still few studies that explicitly examine how varying levels of self-efficacy (high versus low) affect learning achievement and learning motivation in practice-based microteaching, especially among pre-service ICT teachers, despite the growing recognition of the significance of self-efficacy in educational contexts. This study gap emphasizes the need for further empirical data to expand on our knowledge of how self-efficacy influences learning outcomes and teaching competencies in technology-related teacher education. According to the definition given above, this study examined how variations in self-efficacy levels, both high and low, affect learning motivation and accomplishment in the context of practice-based microteaching for aspiring ICT teachers. This study specifically aimed to compare the differences in these two variables across student groups with high and low levels of self-efficacy. As a result, the following two research questions are developed:

(1) How do learning achievements among pre-service ICT teachers with high and low self-efficacy differ in practice-based microteaching?
(2) How do learning motivations (intrinsic and extrinsic) among pre-service ICT teachers with high and low self-efficacy differ in practice-based microteaching?

METHOD

This study employed an experimental research method to compare two groups of students, categorized into high and low self-efficacy groups. The total number of participants in this study was 84 students, divided into 39 students in the high self-efficacy group and 43 students in the low self-efficacy group. The age range of the participants was approximately 19-21 years. The division of the groups was based on the results of a self-efficacy questionnaire completed by the students. Based on the scores obtained from the questionnaire, the students were divided into two large groups. This study was conducted at a university in East Java, with the course "Teaching Skills and Microteaching."

Figure 1 shows the research procedure. The total number of meetings in this study was 13 weeks. In the first 6 weeks, students received basic training on teaching and learning. After the training, in the following week, students were asked to fill out a questionnaire about learning motivation, which consisted of two parts, namely intrinsic motivation and extrinsic motivation. Subsequently, the students were organized into six groups, each consisting of 13–14 members, with a mentor assigned to facilitate and supervise the microteaching process. Within these groups, students took turns practising based on the lesson plans they had individually developed. The microteaching program spanned five weeks and included four practice sessions. The students in this microteaching activity were peers within each formed team. In the following week, students were asked to conduct teaching practice and complete a learning motivation questionnaire.

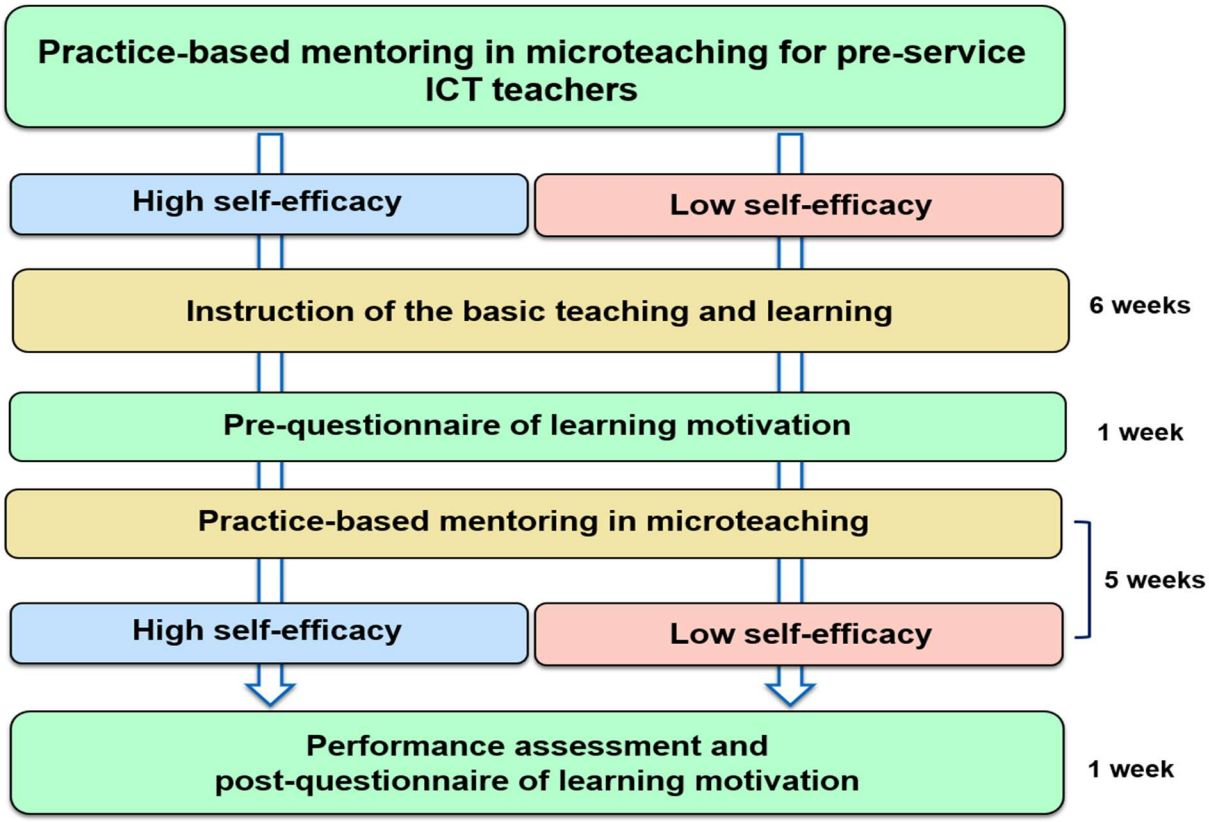

Figure 1. Research procedure

This study refers to Wang and Lin (2007) to observe and evaluate students' self-efficacy. From the students' self-efficacy scores, the mean value is calculated, which can be divided into two groups (high and low). For learning achievement, assessment is based on four components that determine the final score, namely attendance, participation, learning planning, and microteaching implementation. Learning motivation, on the other hand, is based on Wang and Chen (2010) and includes three questions for intrinsic motivation and three items for extrinsic incentive. Examples of intrinsic and extrinsic motivation are: "I prefer challenging course material in a class like this so I can learn new things" and "Getting a good grade in this class is the most satisfying thing to me." The questionnaire's Cronbach's alpha value was. 80.

The data in this study were collected using two approaches. The first was a learning performance assessment, obtained by asking students to perform individually in front of the class to demonstrate their teaching performance. Each student's performance was evaluated based on predetermined criteria aligned with the microteaching objectives. The second approach involved collecting student perceptions through a questionnaire. This instrument measured both intrinsic and extrinsic motivation, and it was administered twice: as a pre-questionnaire before the intervention and as a post-questionnaire after the intervention.

The data analysis involved both descriptive and inferential statistical procedures. To analyze learning performance, an independent t-test was employed because this test is appropriate for comparing the mean scores between two independent groups and determining whether the observed differences are statistically significant. To quantify students' motivational perceptions, Analysis of Covariance (ANCOVA) was employed since the method supports comparison of post-questionnaire scores between groups statistically controlled for baseline differences determined on the pre-questionnaire. The technique improves the accuracy of the analysis by removing the variation at baseline and separates the intervention effect from students' motivation. Before performing the main analyses, the data were all tested for linearity, homogeneity, and normality assumptions to ascertain the validity and reliability of the statistical techniques used.

RESULTS AND DISCUSSION

The analysis's findings are presented in this part along with a discussion of how they relate to the goals of the study and other literature. Examining how students' self-efficacy levels both high and low affect their learning motivation and accomplishment in practice-based microteaching is the primary goal. The findings are

divided into two sections: (1) a comparison of learning motivation and (2) a comparison of learning accomplishment between students with high and low self-efficacy. The purpose of these studies is to present empirical data on the potential influence of self-efficacy on the motivation and performance of pre-service ICT instructors.

Table 1. The t-test results of the learning achievement

Group	N	Mean	SD	t	*p*
High self-efficacy	39	85.79	1.94	0.434	0.665
Low self-efficacy	43	85.63	1.14		

Table 1 presents the findings of an independent t-test of students' learning achievement. Descriptive statistics were calculated before the analysis. The high self-efficacy group (n = 39) reported a mean value of 85.79 (SD = 1.94), while the low self-efficacy group (n = 43) reported a mean value of 85.63 (SD = 1.14). These values reaffirmed that both groups equaled relatively comparable levels during microteaching practice. Before performing the independent t-test, the normality and homogeneity assumptions were checked. The outcome of the Kolmogorov–Smirnov/Shapiro–Wilk tests revealed that the data in the two groups were normally distributed ($p > .05$). Levene's test also revealed that the variance homogeneity assumption was satisfied. As the assumptions were satisfied, the t-test was deemed fit to utilize. The t-test outcome showed that the mean scores were 85.79 in the high self-efficacy group and 85.63 in the low self-efficacy group. They did not differ with one another in learning achievement ($t = 0.434$, $p < .05$). This means that there was no variation in the learning achievement of the two groups in practice-based mentoring in microteaching in pre-service ICT teachers.

This supports the findings of Arsal's (2014) study, which found that mentor-based microteaching generally improves students' self-efficacy. In actuality, though, there was no discernible difference between pupils with high and low levels of self-efficacy according to the study's findings. This runs counter to Abdi and Rahmania's (2023) findings, which showed that learning achievement is influenced by students' self-efficacy. The findings of a study by Mahyuddin et al. (2006), which claimed that correlational analysis revealed positive connections between a number of self-efficacy measures and academic achievement, are likewise at odds with this finding.

Regardless of students' starting levels of self-efficacy, these findings underscore the importance of ensuring equal access to high-quality teacher education from the perspective of Sustainable Development Goal (SDG) 4: Quality Education (Malik et al., 2025). Given that the results of the high and low self-efficacy groups were similar, practice-based mentoring in microteaching can be used as an inclusive teaching strategy. This is in line with the SDG 4 goal, which is to guarantee inclusive, egalitarian, high-quality education and encourage opportunities for lifelong learning for everyone (Smith et al., 2020). Regardless of pre-service teachers' psychological preparedness, teacher education programs can assist them in acquiring the professional competencies required to deliver high-quality instruction in the future by providing equal practice opportunities and structured mentoring.

ANCOVA was used to analyze the intrinsic and extrinsic motivation for learning among the pupils. Descriptive statistics were computed for both groups before ANCOVA. Pre-questionnaire mean scores for intrinsic motivation and extrinsic motivation were 3.55 (SD = 0.64) and 3.85 (SD = 0.55), respectively, for the high self-efficacy group (n = 39) and 3.50 (SD = 0.60) and 3.75 (SD = 0.58), respectively, for the low self-efficacy group (n = 43). The ANCOVA assumptions were tested before the primary analysis. Both groups were homogeneous, according to the Levene's test results ($p > .05$). Both intrinsic motivation ($F = 1.31$, $p > .05$) and extrinsic motivation ($F = 0.03$, $p > .05$) did not significantly interact with the independent variables, according to the study of the homogeneity of regression slopes. These findings validate the application of this statistical method, as the ANCOVA assumptions were satisfied.

Table 2. The ANCOVA result for learning motivation

	Group	*N*	Mean	*SD*	Adjusted mean	*SE*	*F*	η^2
Intrinsic motivation	High self-efficacy	39	4.48	0.52	4.48	0.07	51.61***	0.40
	Low self-efficacy	43	3.81	0.31	3.81	0.06		
Extrinsic motivation	High self-efficacy	39	3.79	0.26	3.79	0.07	39.62***	0.33
	Low self-efficacy	43	4.41	0.57	4.41	0.07		

Information ***$p < .001$

The analysis of the homogeneity of the regression coefficient revealed that the two groups had no significant difference (F = 1.31, $p > .05$) for intrinsic motivation, meaning there was no interaction between covariates and independent variables in the students' intrinsic motivation. There was no interaction between covariates and independent factors in the students' extrinsic motivation, according to the examination of the homogeneity of the regression coefficient, which showed that there was no significant difference between the two groups (F = 0.03, $p >.05$) for extrinsic motivation. The ANCOVA result is displayed in Table 2. There was a significant difference between the two groups in terms of intrinsic motivation (F = 51.61, $p <.001$, η^2 = 0.40). Students with high self-efficacy in practice-based mentoring in microteaching had significantly higher intrinsic motivation than those with low self-efficacy, according to the adjusted scores (high self-efficacy = 4.48; low self-efficacy = 3.81). In addition, the effect size (η^2) for the ANCOVA results indicated a high effect size, based on Cohen's (1988) proposition. In terms of extrinsic motivation, a significant difference was obtained between the two groups (F = 39.62, $p < .001$, η^2 = 0.33). The adjusted scores (high self-efficacy = 3.79; low self-efficacy = 4.41) revealed that the students with low self-efficacy in practice-based mentoring in microteaching had significantly better extrinsic motivation than those students with high self-efficacy. Moreover, the effect size (η^2) for the ANCOVA results indicated a high effect size, based on Cohen's (1988) proposition.

The findings of this study support the results of Tabernero and Hernández (2011), which revealed that students' self-efficacy influences their intrinsic motivation. This proves that high self-efficacy is closely related to students' intrinsic motivation. The effect size shows a very high difference in scores. This is a recommendation for further research to explore this further using qualitative analysis. On the other hand, this study found opposite results for students' extrinsic motivation. Students with low self-efficacy had significantly higher extrinsic motivation compared to students with high self-efficacy. This aligns with the findings of Walker et al. (2006), which showed that self-efficacy has an inverse relationship with extrinsic motivation. However, Ridwan et al. (2025) revealed that both dimensions of motivation (intrinsic and extrinsic) significantly contribute to students' self-efficacy. The findings of this study offer a unique perspective for future research (Morris et al., 2017).

However, this study has several limitations that should be acknowledged. First, the sample was limited to pre-service ICT teachers from a single institution, which may restrict the generalizability of the findings to other educational contexts or subject domains. Second, the study employed a quantitative design with ANCOVA as the main analytical approach, which provided robust statistical insights but did not capture the nuanced, contextual, and experiential aspects of students' motivation during practice-based mentoring. Third, self-efficacy and motivation were measured through self-reported instruments, which are subject to potential biases such as social desirability or overestimation of abilities.

Through the SDGs, the research informs the fulfillment of SDGs 4 (Quality Education) and 5 (Gender Equality). Through facilitating diverse learner profiles to excel in teacher education programs, the research shows that practice-based mentoring through microteaching is capable of creating intrinsic motivation, especially among students with higher self-efficacy. This enhances inclusive and equitable quality education (Wawire et al., 2025). Second, targeted mentoring strategies that account for different motivational orientations are required, bearing in mind the research findings that low self-efficacy students are extrinsically motivated. Ensuring that all pre-service male and female teachers, whether assertive or not, are provided with what they require to become professional teaching educationists is in unison with SDG 5, which addresses eradicating inequalities and access to opportunities based on gender or individuality (Acar-Erdol et al., 2022; Mohammed et al., 2025).

CONCLUSION

Identification of the role of self-efficacy in teacher training is critical, especially in practice-based settings like microteaching, where affective and cognitive states both regulate learning outcomes. From this research,

it is therefore concluded that self-efficacy has a differential role in determining students' motivation and learning outcomes in practice-based microteaching among pre-service ICT teachers. Whereas no differences were found in scholarship performance between high and low self-efficacy learners, differential motivational orientations were noted: high self-efficacy learners had greater intrinsic motivation, while low self-efficacy learners depended extensively on extrinsic motivation. These outcomes highlight the necessity of determining learners' level of self-efficacy before instruction in order to prepare teaching and mentoring plans that maximize both cognitive capability and emotional growth. Subsequent studies should seek to increase the sample size and representativeness across teacher education programs and utilize longitudinal or mixed-methods designs in an effort to better examine the dynamics by which self-efficacy impacts teaching ability, classroom control, and emotional stability over the long term. Examination of other psychometric measures like anxiety, boredom, self-regulation, and student motivation would also shed more light on the multifaceted correlations between self-efficacy and learning under microteaching conditions.

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AUTHOR CONTRIBUTIONS

Husni Mubarok: Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, and Writing - Original Draft; **Yossiri Yossatorn**: Methodology, Formal Analysis, Resources, Data Curation, and Writing - Review & Editing; **Hirnanda Dimas Pradana**: Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, and Writing - Review & Editing; **Syaiputra Wahyuda Meisa Diningrat**: Conceptualization, Investigation, Resources, Data Curation, and Writing - Review & Editing; **Arqoma Nurveda Carreza**: Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, and Writing - Review & Editing; and **Favian Avila Syahmi**: Formal Analysis, Investigation, Validation and Supervision.

DECLARATION OF COMPETING INTEREST

The authors declare no known financial conflicts of interest or personal relationships that could have influenced the work reported in this manuscript.

DECLARATION OF ETHICS

The authors declare that the research and writing of this manuscript adhere to ethical standards of research and publication, in accordance with scientific principles, and are free from plagiarism.

DECLARATION OF ASSISTIVE TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that Generative Artificial Intelligence and other assistive technologies were not excessively used in the research and writing process of this manuscript. Specifically, ChatGPT was utilized for brainstorming ideas, and Grammarly was employed for grammar and style correction, paraphrasing, and improving language clarity and coherence. All AI-generated content has been thoroughly reviewed and edited by the authors to ensure accuracy, completeness, and adherence to ethical and scientific standards. The authors take full responsibility for the final version of the manuscript.

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