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ORIGINAL

Exploring Prospective Teachers' Perceptions of Teaching Creativity through Microteaching Lesson Study: Impact on Professional Development

Explorando las percepciones de los futuros docentes sobre la creatividad docente mediante el estudio de lecciones de microenseñanza: Impacto en el desarrollo profesional

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ABSTRACT

Introduction: teaching creativity is essential in capturing students' attention and creating an effective learning process. This study aims to explore prospective teachers' perceptions of creativity in teaching through microteaching lesson study experiences
Method: the research employed a qualitative method with a case study approach involving several pre-service teacher education students participating in a microteaching and lesson study program. Data were collected through observation, interviews, and document analysis, then analyzed using thematic techniques. The results show that prospective teachers perceive teaching creativity as the use of innovative methods, adaptation to students' needs, and the ability to develop engaging learning materials. They also feel that microteaching and lesson study help improve self-confidence, self-reflection, and collaboration in developing creativity.
Results: these findings highlight the importance of collaborative practice-based experiences in shaping prospective teachers' perceptions and creative skills.
Conclusions: the conclusion of this study is that microteaching experiences based on lesson study are effective in building positive perceptions and creative teaching skills among prospective teachers.

Keywords: Teaching Creativity; Prospective Teachers; Perceptions; Microteaching Lesson; Study; Instructional Innovation.

RESUMEN

Introducción: enseñar creatividad es esencial para captar la atención del alumnado y crear un proceso de aprendizaje eficaz. Este estudio busca explorar las percepciones de los futuros docentes sobre la creatividad en la docencia mediante experiencias de microenseñanza y estudio de lecciones.
Método: la investigación empleó un método cualitativo con un enfoque de estudio de caso, involucrando a varios estudiantes de formación docente en prácticas que participaron en un programa de microenseñanza y estudio de lecciones. Los datos se recopilaron mediante observación, entrevistas y análisis de documentos, y posteriormente se analizaron mediante técnicas temáticas. Los resultados muestran que los futuros docentes perciben la creatividad en la docencia como el uso de métodos innovadores, la adaptación a las necesidades del alumnado y la capacidad de desarrollar materiales de aprendizaje atractivos. También consideran que la microenseñanza y el estudio de lecciones ayudan a mejorar la autoconfianza, la autorreflexión y la colaboración para el desarrollo de la creatividad.

Resultados: estos hallazgos resaltan la importancia de las experiencias prácticas colaborativas para moldear las percepciones y las habilidades creativas de los futuros docentes.
Conclusiones: la conclusión de este estudio es que las experiencias de microenseñanza basadas en el estudio de lecciones son eficaces para desarrollar percepciones positivas y habilidades docentes creativas en los futuros docentes.

Palabras clave: Creatividad Docente; Futuros Profesores; Percepciones; Lección De Micro Tecnología; Estudio; Innovación Instruccional.

INTRODUCTION

Creativity is a key element in 21st-century education that can be created through innovative, meaningful, and student-centered learning experiences.[1] Over the past five years, various studies have highlighted the importance of creativity in teaching as a key factor in improving the quality of education and students' readiness to face future challenges.[2,3,4] Creativity in teaching is considered important because it can create a more dynamic ad adaptive learning environment, which increases student engagement and motivation. Moreover, creativity in teaching allows teachers to tailor lesson materials to diverse student learning styles, making learning more inclusive and effective.[5,6,7]

Creative approaches also foster student collaboration, promote teamwork, and prepare them to work in complex, project-based environments, which are increasingly common in the modern workforce. This is where the integration of approaches such as Microteaching Lesson Study (MLS) in teacher professional development programs becomes essential. MLS involves collaborative teaching reflection and simulated teaching skills; it also enhances classroom management and instructional abilities. Moreover, MLS supports the professional development of pre-service teachers and increases motivation, cooperation, and the sharing of teaching ideas.[8] Previous studies have shown that MLS has significant potential in improving prospective teachers' competencies. Lewis et al found that teachers involved in MLS tend to be more capable of analyzing and improving their teaching practices through constructive feedback.[9] In addition, Yoshida, Matsuda, and Miyamoto demonstrated that MLS enhances collaboration among teachers and fosters supportive learning communities.[10] However, most of these studies have primarily focused on improving technical and reflective skills without giving sufficient attention to how MLS can support the development of teaching creativity.[11]

This study aims to fill that gap by exploring the impact of Microteaching Lesson Study implementation on the development of teaching creativity among prospective teachers. The main contribution of this research is to provide in-depth insights into the mechanisms behind the development of teaching creativity through MLS.[12,13] By understanding the experiences and reflective processes of prospective teachers, this study can offer practical recommendations for more effective and creativity-focused professional development programs.[14,15,16]

Theoretically, MLS is grounded in two main foundations: constructivist learning theory and collaborative learning models. Constructivism encourages teachers to build knowledge through direct experience and reflection, while collaborative learning enables teachers to share insights and strategies through professional interaction.[17] Fernández stated that MLS not only strengthens teachers' technical teaching competencies but also fosters reflective thinking and teamwork skills.[18] Through iterative and systematic processes, MLS enables the long-term development of higher-quality and more effective teaching.

The theoretical framework on teaching creativity focuses on how teachers can develop and implement innovative ideas and methods in the learning process. Teaching creativity is influenced by constructivist theory, as described by Sawyer and Henriksen, who emphasized that effective learning occurs when students actively construct their knowledge through direct experience and interaction with their environment.[19] In this context, teachers are expected to create learning situations that support experimentation, exploration, and critical thinking. [20,21] Constructivism theory emphasizes that students construct their own knowledge. On the other hand, Vygotsky's concept of the Zone of Proximal Development (ZPD) highlights the importance of providing appropriate challenges to support student development.[22] The ZPD clarifies the social context in which constructivism occurs. It explains that the constructivist process occurs when students receive support at a range of abilities above their current level. In other words, constructivism provides general principles about the process of knowledge construction, while the ZPD provides a practical framework for determining when and how support should be provided in the learning process.

The concepts of constructivism theory and the ZPD guide the learning process. A prospective teacher should be able to identify the characteristics of a creative teacher in order to create constructive learning. Research by Cremin and Chappell shows that a prospective teacher is able to identify individual student needs and apply innovative teaching methods to help them reach their full potential.[23] Therefore, creative teaching involves not only implementing new methods but also adapting them based on student needs and abilities to

achieve optimal learning outcomes. In addition, prospective teachers need to understand the characteristics of creativity in the learning process. Learning must reflect indicators of creative thinking so that student creativity is formed.

In the educational context, there are several important indicators that help teachers develop creativity in teaching based on five core thinking abilities: originality, flexibility, fluency, elaboration, and sensitivity.[24,25] Originality refers to the teacher's ability to generate a variety of ideas and solutions in teaching, offering alternative instructional methods suited to students' needs.[26] Flexibility involves the ability to view problems from different perspectives and adapt to various teaching approaches to help students better understand the material. Fluency relates to the creation of unique teaching methods that integrate elements from multiple disciplines, encouraging students to see connections among different concepts.[23,24,25,26,27] Elaboration allows teachers to add relevant details to learning materials, making them more engaging and in-depth. Finally, sensitivity helps teachers evaluate the effectiveness of teaching strategies and engage in self-reflection to improve teaching quality.[28] In this study, the concept of teaching creativity is adapted from Schiavio, Biasutti, and Antonini, which focuses on: 1) Innovation in Content Delivery; 2) Use of Technology in Teaching; 3) Flexibility and Adaptability; 4) Ability to Motivate and Inspire; 5) Use of Project-Based or Problem-Based Learning Approaches; 6) Development of an Enjoyable and Collaborative Learning Environment.[27]

Studies by Boden; Henriksen, Mishra, and Fisser show that although prospective teachers possess theoretical knowledge about creativity, they often struggle to apply it in practice.[29,30] Research on prospective teachers' teaching creativity shows that they frequently encounter difficulties in developing innovations and variations in teaching methods and media. They tend to rely on conventional approaches and are less capable of creating engaging and innovative learning atmospheres, which hinders active and creative learning processes.[31,32] In addition, a lack of practical experience and adequate pedagogical skills also serves as a barrier to improving their teaching creativity.[33] In fact, as future educators, prospective teachers need to be equipped with creative and reflective thinking skills from the early stages of their education.[24,33] Unfortunately, many prospective teachers still lack a comprehensive understanding of what teaching creativity means and how to apply it in real teaching contexts.

The process of reflection and collaboration during training, such as microteaching and lesson study, is essential in helping prospective teachers overcome these challenges and develop their professionalism.[33,34,35] Furthermore, studies by Sari et al; Nguyen reveal that approaches such as microteaching and lesson study can serve as effective means for developing pedagogical skills, including creativity, through collaborative reflection cycles and hands-on practice.[36,37] However, research that specifically explores prospective teachers' perceptions of teaching creativity in the context of microteaching lesson study remains limited.

Based on these issues, this study aims to explore prospective teachers' perceptions of creativity in teaching through their experiences participating in microteaching lesson study. The research employs a qualitative approach to deeply investigate the views, meanings, and reflections of prospective teachers toward the learning process they have undergone. Through this study, it is expected that new insights will emerge to strengthen instructional design in teacher education, particularly in creating learning experiences that foster creativity and sustainable professional development.

METHOD

Research Design and Participants

This exploratory case study was conducted at Universitas Veteran Bangun Nusantara to explore prospective teachers' perceptions of teaching creativity in the context of microteaching and lesson study. Within this research context, understanding how pre-service teachers form perceptions of teaching creativity is essential—not only in how they deliver content but also in how they utilize time constraints, limited resources, and miniature classrooms to create effective and enjoyable learning experiences.[38,39] Thus, the study emphasizes the significance of teaching creativity and examines how the microteaching and lesson study processes contribute to the development of their teaching creativity.

Intervention Program

The intervention program aimed to explore lived experiences and perceptions in fostering prospective teachers' teaching creativity.[40,41] In this study, the intervention was carried out with 33 prospective teachers (4 males; 29 females). Technical guidance and observation were conducted by microteaching lecturers as mentors over two months through microteaching lesson study practices. The purpose of this intervention program was to equip elementary school pre-service teachers with teaching creativity so they could carry out planned teaching practices. The intervention procedure began with providing participants with case analysis materials and reflective practice within the microteaching lesson study. The use of social-based MLS teaching practices was chosen to initiate peer collaboration in fostering teaching creativity.

Data Collection

Using a qualitative approach, this study explored prospective teachers' understanding through observation, in-depth interviews, and document analysis, including lesson plans and reflection notes. The observational data collected consisted of observation scores from the participants' teaching practice. These were compiled into a results dataset in spreadsheet form by applying principles of data consistency. The results were then analyzed thematically and presented in the form of bar charts showing participants' response percentages. The thematic analysis results in the form of bar charts were interpreted with attention to main themes, findings, extreme values, and outliers that may affect the results.

Interview data were analyzed using an interpretative phenomenological approach. We followed the interview data analysis steps as proposed by which include: (1) listening to oral data, (2) shaping oral data, (3) communicating oral data with interpretative intent, (4) reproducing or reconstructing oral data, and (5) building data credibility or validating data. All interview data were transcribed and organized for further analysis. We focused on the essence of the data for closer analysis and interpretation.[42] It is important to note that interview data discursively convey values, beliefs, feelings, thoughts, and narratives that allow for multiple interpretations.[43] Thematic analysis was used as a tool to identify similarities, relationships, and differences across the dataset.[44] The data presented in this case study report were selected based on how they revealed common voices and relationships among participants' responses.[43]

Data were collected during several microteaching and lesson study sessions, then thematically analyzed to identify emerging patterns and key themes. Data triangulation from multiple sources was used to increase the validity of the results, thus providing deep insights into how prospective teachers perceive and implement creativity in their teaching.

All indicators in the observation and interview sheets referred to the five core thinking abilities: originality, flexibility, fluency, elaboration, and sensitivity. In microteaching sessions, prospective teachers delivered short teaching practices in front of peers and observers (lecturers or mentors), who monitored and assessed aspects of creativity in their teaching. Observers used a specially designed observation sheet to record various indicators of teaching creativity. Each observation note helped assess how well prospective teachers integrated creativity into their teaching, providing detailed insights into their responsiveness and flexibility in instructional situations. The following is table 1, which outlines the focus of the observation.

Table 1. Observation Indicators in Microteaching Lesson Study

Indicator	Observation	Yes	No
Originality	Uses new approaches in delivering content to make it interesting and easy for students to understand		
	Creates inspiring activities that stimulate students' enthusiasm for learning		
Flexibility	Integrates technology that suits instructional needs		
	Adjusts teaching methods to individual student needs and class dynamics		
	Modifies or adapts learning projects based on students' development		
Fluency	Responds to classroom situations quickly and effectively		
	Uses activities that maintain students' continuous engagement		
Elaboration	Explains concepts in detail using various methods to ensure all students understand the material		
	Designs projects or problems in a detailed and relevant way to real-life contexts		
Sensitivity	Selects technology appropriate to students' capabilities and comfort		
	Recognizes students' emotional needs to boost their motivation in learning		
	Builds a fun and collaborative learning environment		

After completing their teaching practice, participants were asked whether they were willing to take part in an individually structured audio-recorded interview. After signing the interview consent form, participants were invited for interviews. Each interview session lasted approximately 20–30 minutes. Table 2 below presents the list of interview questions.

Table 2. Interview Indicators in Microteaching Lesson Study

Indicator	Question
Originality	How do you create new ways to make the material you teach more interesting and easier for students to understand?
	What inspiring activities have you designed to encourage students to be more enthusiastic about learning?
Flexibility	In what situations have you used technology in teaching, and how did you adjust its use?
	What are your strategies for adapting teaching methods to individual student needs or class dynamics?
	How do you modify learning projects or problems when there are changes in students' understanding or development?
Fluency	Can you describe an experience when you had to quickly handle a certain situation in class? What did you do?
	What activities do you use to keep students consistently engaged in the learning process?
Elaboration	What methods do you use to explain material in detail so that all students can understand it?
	How do you design relevant projects or problems to help students understand the material better?
Sensitivity	How do you recognize students' emotional needs to help them stay motivated in learning?
	How do you create a pleasant and collaborative learning environment that is comfortable for students?

Data Analysis

In this study, the researcher used data analysis techniques based on Miles & Huberman. These techniques were implemented through several interactive and continuous procedures. First, the researcher collected data using observation sheets, interview guides, and documentation sheets. The data collection process took days to months, resulting in a diverse set of data. Second, the researcher condensed the data. This means that the researcher sorted, summarized, and focused on important points in accordance with the objectives of the study. This activity was carried out to provide a clear picture and facilitate further data collection. Third, the researcher presented the data in several formats, including narratives, interview transcripts, and tables. This data presentation was tailored to the available data. Fourth, the researcher drew conclusions based on the compiled data. The process of drawing final conclusions was also linked to the reality of the research results in the field. These four stages are interconnected from the first stage to the next.

RESULTS

Based on the observational results and interview data, this study explored prospective teachers' perceptions of teaching creativity in the microteaching course through lesson study. Specifically, it examined how pre-service teachers perceive teaching creativity in the aspects of originality, flexibility, fluency, elaboration, and sensitivity. This study identified two main findings: the impact of MLS based on prospective teachers' observations, and the impact of MLS reflection on teaching creativity, presented in table 3 below.

Prospective Teachers' Perceptions of Originality

Observation data shows that 75,75 % of prospective teachers used novel approaches to deliver material to make it engaging and easy for students to understand. After completing the planning phase of the Micro-Learning Learning (MLS), the prospective teachers received feedback on how to make the material more engaging using visual media and project-based learning models. Furthermore, 84,84 % of prospective teachers were able to create inspiring activities that fostered student enthusiasm for learning. During the implementation phase, prospective teachers used a variety of methods to deliver their lessons. Their delivery did not rely solely on the PjBL or PBL models but also included a variety of discussions that could encourage learning motivation. This is supported by interview excerpts that supplemented the questionnaire data after completing the reflection on the micro-learning teaching case study:

"I understand the importance of adapting my teaching style to student characteristics. I incorporate visual technology, group discussions, and project-based learning to make lessons more interesting and easier to understand. Additionally, I plan to use interactive techniques such as Q&A and educational games to maintain student engagement."

Table 3. Results of Observations on Prospective Teacher Creativity

Aspect	Observation	Number of Prospective Teachers		Average Percentage	
		Yes	No	Yes	No
Originality	Using a new approach in delivering content to make it interesting and easy for students to understand	25	8	80,3 %	19,7 %
	Creating inspiring activities that foster students' enthusiasm for learning	28	5		
Flexibility	Integrating appropriate technology to meet teaching needs	26	7	70,7 %	29,3 %
	Adapting teaching methods to individual student needs and classroom dynamics	23	10		
	Change or adapt learning projects based on student development	21	12		
Fluency	Respond to classroom situations quickly and effectively	26	7	80,3 %	19,7 %
	Using activities that maintain ongoing student engagement	27	6		
Elaborasi	Explain concepts in detail using various methods so that all students understand the material	29	4	90,9 %	9,1 %
	Designing learning projects or problems in detail and relevant to real life	31	2		
Sensitivitas	Choose technology that suits students' abilities and comfort levels	32	1	88,9 %	11,1 %
	Recognizing students' emotional needs to increase their motivation in learning	29	4		
	Building a fun learning atmosphere that supports student collaboration	27	6		

Prospective Teachers' Perceptions of Flexibility

Observational data shows that the majority of prospective teachers have a positive perception of flexibility in teaching, although there are still several areas for improvement. One aspect that needs further improvement is their ability to integrate technology into learning, which achieved a percentage of 78,78 %. This reflects that programs such as microteaching and lesson study have contributed significantly to helping prospective teachers understand the importance of technology as a relevant tool in modern education. However, approximately 29,3 % of prospective teachers have not fully mastered this skill, necessitating further training in the use of technology that aligns with student needs.

Flexibility in adapting teaching methods to individual student needs and classroom dynamics was demonstrated by 69,7 % of preservice teachers, reflecting their awareness of student diversity. However, the remaining 30,3 % indicated gaps that require special attention, particularly in understanding and responding to changing classroom dynamics. A greater challenge emerged in the aspect of modifying learning projects based on student development, where only 63,6 % of participants demonstrated proficiency. This percentage was the lowest among the three aspects, indicating that preservice teachers often struggle to design lessons that adapt to changing student needs. This highlights the need to embed more reflective practice in microteaching and lesson study programs to help preservice teachers recognize and respond effectively to change. This is supported by an interview excerpt from a teacher who stated:

"I usually try to recognize students' needs through direct interaction. When teaching, I often ask questions to understand their difficulties. In microteaching, I used a discussion approach for active students and a more individual approach for quieter ones."

Prospective Teachers' Perceptions of Fluency

Observations from microteaching and lesson studies indicated that fluency—defined as the ability to respond effectively to classroom situations and design engaging learning activities—was largely achieved. Seventy-eight (78,78 %) of preservice teachers demonstrated strong skills in handling classroom dynamics, such as student disruptions or unexpected questions, with appropriate responses. Furthermore, 81,81 % of preservice teachers successfully designed activities that maintained student engagement, such as the use of interactive media and reflective assignments.

However, 21,21 % of participants still faced challenges in optimally responding to classroom dynamics, and 18,18 % of preservice teachers struggled to consistently maintain student engagement. These challenges indicate

the need for additional training in classroom management and the development of creative teaching strategies. Some preservice teachers tended to hesitate in situations that required immediate strategy adjustments, which could cause students to lose focus or motivation. One preservice teacher reflected:

"During microteaching, I faced a situation where some students started losing focus and talking to each other during my explanation. I paused my explanation briefly and gave a simple attention cue to refocus them. Then, I asked a related question to a student who seemed disengaged. This made them feel involved and more attentive. I also inserted a quick word game to lighten the atmosphere. This was quite effective, as the classroom became more conducive, and students became actively engaged again."

Prospective Teachers' Perceptions of Elaboratorion

Based on observations, prospective teachers were able to explain concepts in detail using various methods, achieving a percentage of 87,87 %, and were able to design projects in detail, achieving a percentage of 93,93 %. This indicates that prospective teachers' perceptions of elaboration are running smoothly, although there are still minor obstacles that can be overcome. This is also supported by an interview excerpt from a teacher who stated:

"I learned that not all students have the same learning styles. Therefore, I became more flexible in choosing methods. For example, when I used a visual method, some students still had difficulties, so I complemented it with verbal explanations or hands-on practice. Moreover, from the projects I designed, I realized the importance of giving clear instructions and ensuring the project is directly related to students' daily lives. This helps them better understand the concepts and makes learning more meaningful. This reflection process also helps me continually improve and develop my creativity in elaborating material in the future."

Prospective Teachers' Perceptions of Sensitivity

Observations from microlearning and sensitivity studies indicate that prospective teachers generally demonstrate good responsiveness to student needs, although some areas require improvement. Regarding technology selection, 96,96 % of prospective teachers successfully selected learning tools and technology appropriate to their students' abilities and comfort. This indicates that the majority understand the importance of aligning tools with student characteristics to support effective learning. Furthermore, prospective teachers were also able to recognize students' emotional needs to increase motivation, as demonstrated by a percentage of 87,87 %.

The aspect of creating a fun and collaborative learning environment showed lower achievement than the other two aspects. 81,81 % of prospective teachers were able to create a conducive learning atmosphere where students felt comfortable collaborating and actively participating in learning activities. However, 18,2 % still needed improvement in this area. Common obstacles encountered included a lack of variety in interactive teaching methods and limited time for lesson planning.

DISCUSSION

Creativity can be fostered through various tasks within a positive school environment where teachers recognize their important role in stimulating student creativity. The role of teachers and the school environment in developing student creativity has been discussed by many researchers.[45] Learning theory is cited as part of the creative process and environment.[46,47,48] Several studies note that creativity results in new products or ideas that are useful or valuable to society.[48,49,50,51]

Prospective teachers' perspectives on originality after implementing MLS emphasize the importance of creativity and flexibility in designing engaging and relevant learning experiences for students. The microteaching learning process (lesson study) not only helps prospective teachers develop new and creative methods but also provides a deeper understanding of the importance of adaptation in teaching.[2] This suggests that reflection after microteaching increases prospective teachers' awareness of the need for student-centered methods and a learning environment that supports creativity.

Regarding the teaching power of creativity, prospective teachers believe that classroom tasks or problems encourage students to generate original solutions. Creativity manifests when someone encounters a new, unstructured situation and attempts to define the problem. Pre-service teachers in developing creativity also emphasized the creation of student-centered learning environments. Pre-service teachers agreed that teacher education contributed to their understanding of creativity and creative teaching. Findings from the study[52] suggest that educators should incorporate several teaching strategies when preparing pre-service teachers for classroom teaching. These findings align with studies that discuss sociocultural and constructivist learning in relation to creativity development.[46,47,48,53]

The flexibility aspect revealed a training gap among prospective teachers, indicating the need for additional simulations and case studies—particularly using technology-based and data-reflective approaches, which resulted in the lowest percentage of observational data and the need for continuous improvement. Although

microteaching and lesson studies have shown positive results in building flexibility, prospective teachers need to understand and implement flexibility as a key indicator of teaching creativity by adapting methods and technology to suit students' needs. Lesson studies play a crucial role in supporting this creativity by providing collaborative spaces for experimentation and reflection on teaching practices.

Prospective teachers reflected on active learning environments as part of the creative school philosophy, which should stimulate and support children's learning by providing inquiry-based, interdisciplinary, and multi-minded approaches to learning and teaching.[54] This is consistent with the development of a framework for creativity in children, which involves educational processes such as the use of activities (e.g., open-ended questions, allowing students to create their own learning) as a framework to help children develop their creative skills. Previous research[55] suggests that teachers believe that a classroom learning environment that encourages children's creativity (e.g., embracing diverse ideas, focusing on children's strengths and interests) can help them improve their creativity skills.

Teachers must have the ability to stimulate children's learning, foster divergent thinking, foster lifelong learning, and create their own teaching methods tailored to the children's needs. Prospective teachers' perceptions of their role and characteristics in education align with previous research[56,57] (which demonstrates teachers' understanding of creativity and teaching approaches related to developing creativity and maintaining a supportive classroom environment.

Creativity in learning, according to innovative teachers, includes the application of project-based learning methods and the use of educational technology.[58,59] Flexibility and adaptability in developing lesson plans are also integral to creative teachers' perceptions, as they understand that each class and student has unique needs. Rather than simply imparting knowledge, creative teachers engage students in the creative process, giving them the freedom to express their ideas.[60] However, a lack of experience and confidence often act as barriers. Therefore, continuous learning, reflective support, and a collaborative environment are crucial to fully realizing the potential of creative teaching, enabling prospective teachers to adapt their teaching strategies to meet the diverse needs of students. Teaching creativity is not only about developing new strategies, but also about how these strategies are applied adaptively to meet the diverse needs of students.

Fluency is evident in prospective teachers' ability to design learning activities that keep students engaged. In the context of lesson study, prospective teachers are encouraged to design, implement, and evaluate interactive and relevant activities tailored to students' needs. Activities such as group discussions, educational games, or the use of learning technology are indicators of how creatively and fluently prospective teachers apply their skills. Deeper reflection sessions during learning can also help prospective teachers critically evaluate their strategies and gain new insights from the experiences of their peers. Individual mentoring for those who need additional support can be an effective way to help them reach their full potential. These steps are expected to further hone prospective teachers' fluency, preparing them to face the complex challenges of real-world teaching.

Teachers' beliefs about creativity translate into practice as long as creativity is recognized as an important learning goal and the conditions necessary for its development are ensured to empower teachers to achieve these goals.[61] Teacher education plays a crucial role in providing pedagogical training to teachers on the nature of creativity, the characteristics of creative students, and the requirements of a classroom environment to foster creativity.

Overall, prospective teachers believe that creative practices can be learned, which is crucial because it influences how teachers handle the expression of creative behavior in their classrooms. If a teacher believes creativity is a rare, innate quality, they are likely to emphasize it in their practice and may even consider creative behavior a barrier to their actual work. On the other hand, when a teacher views creativity as universal and beneficial to human development, they are expected to use creativity in their teaching while encouraging their students to express and develop their own.[57]

The elaboration aspect achieved the highest percentage. Prospective teachers developed their teaching creativity through reflection and collaboration in the Lesson Study process. In this activity, prospective teachers responded quickly and effectively to classroom situations and activated sustained student engagement. Furthermore, prospective teachers were tasked not only with designing lessons but also with testing and evaluating the effectiveness of the strategies they used. Thus, prospective teachers were able to identify the strengths and weaknesses of their approaches, ultimately enriching their ability to elaborate on learning materials and strategies. In line with the opinions of [62,63], who suggest strategies to gradually overcome obstacles in the education system, such as collaboration with colleagues, gradual implementation, and effective allocation.

Professional development is a key element of an effective professional development program. [64,65] suggest that opportunities for internships are crucial for improving teachers' knowledge and skills. Furthermore, they state that increased knowledge and skills have a significant positive influence on changes in teaching practice. [62,66] Through a combination of theory and practice, microteaching and lesson study allow prospective teachers

to experiment with various teaching methods and receive direct feedback from colleagues and mentors.[67,68] This approach makes microteaching and lesson study effective platforms for developing teaching creativity, particularly in the aspect of elaboration, thus enabling prospective teachers to provide more effective, engaging, and relevant instruction for their students.

This activity encourages changes in teacher perceptions because prospective teachers are placed in the same facility throughout the program, allowing them to discuss issues related to learning. Discussions and sharing opinions and ideas with others can help teachers correct misconceptions about creative learning.[62,69] suggest that ongoing discussions among teachers engaged in similar teaching reform efforts can facilitate change by encouraging the sharing of solutions or problems and by reinforcing a sense of the possibility of improvement.

Prospective teachers' perceptions of sensitivity in learning have achieved high results, as evidenced by the prospective teachers' adoption of technology, recognition of students' emotional needs, and creation of a conducive learning environment. During microlearning, sensitivity to students' emotional needs is often demonstrated through the prospective teachers' personal approach. They pay attention to students who lack confidence by providing verbal encouragement or appreciation for their participation. This approach not only creates a comfortable learning environment but also motivates students to engage in creative learning. Sensitivity in this context encompasses three main aspects: selecting appropriate technology, recognizing students' emotional needs, and creating a learning environment that supports collaboration. During the learning discussion sessions, the prospective teachers' sensitivity became increasingly evident as they reflected on their microlearning experiences. They demonstrated openness to peer feedback and were able to identify areas for improvement, such as how to respond to diverse student needs.

[70,71] stated that teachers are also required to be more innovative and creative, particularly in responding to computer-based learning policies, particularly through technology-literate teachers. Furthermore, during the learning process, students began to provide feedback on questions raised during the learning activities. [72] revealed that student feedback is a key factor in influencing changes in teaching. The most effective feedback was reported to be feedback that moves students from the task to the processing and then to the regulation phase.[73] Providing and receiving feedback on teaching is crucial for the development of prospective teachers.[74,75] reported that some prospective teachers believe that teachers should generate, shape, enhance, and improve students as learners who are generated and shaped.

These findings indicate that the overall observation of prospective teachers' creativity (originality, fluency, elaboration, and sensitivity) has been well implemented, however, there is one aspect that needs improvement, namely flexibility. In the flexibility aspect, skills in integrating technology, adapting teaching methods to student needs, and adjusting projects based on student development need to be further improved. Similarly, [76] that prospective preschool teachers use metaphors to produce something unique and characteristics of creative development. A study investigating science teachers' understanding of creativity reported that teachers strongly associated the concept of originality with creativity.[77] Creative individuals are those who produce original and creative results. According to the results of the study,[78] it was found that when they experienced more microteaching, their creativity in developing activities and using various materials, mostly visual videos and technology-supported activities, improved.

Creative teachers will feel more supported when the curriculum provides flexibility to adapt teaching methods to students' needs and interests, thus enabling students to innovate in education. In addition, school support involving leadership that supports creative initiatives, adequate resources, and ongoing training can increase teachers' perceptions of the importance of creativity in the learning process.[79] According to [80], teachers must have creativity in creative learning, including teachers who are able to stimulate students to generate creativity, ideas in the context of creative thinking, and in the process of doing something. This supports the claim that professional development programs need to help prospective teachers create a shared professional culture by developing a shared understanding of the goals, methods, concerns, problems, and solutions of teaching.

CONCLUSIONS

Prospective teachers have positive perceptions of teaching creativity, particularly in terms of originality, fluency, elaboration, and sensitivity. One aspect that needs improvement is flexibility. In terms of flexibility, skills in integrating technology, adapting teaching methods to student needs, and adjusting projects based on student development need to be further enhanced. The results of this study not only enrich the literature on teaching creativity but also contribute to improving the overall quality of education.

Pre-service teacher training needs to be explored and supported, while effective in-service training can be organized to shape, enhance, and strengthen preschool teachers' creative visions. Collaboration with academics can be helpful in this regard. Furthermore, the preschool teacher education process can be evaluated and updated according to conditions and realities. The implications of these findings suggest that developing teacher creativity is not only related to individual aspects but also to the work environment and

education system. Therefore, efforts are needed to increase prospective teachers' self-confidence through diverse teaching experiences and foster collaboration among teachers. Schools and universities need to ensure that curricula provide space for teacher creativity, and support for university facilities and supervisors is also necessary.

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