

Early Childhood Education Teacher Creativity Development Strategies as 21st Century Skills

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History: Received 03/04/2026 | Revised 05/05/2026 | Accepted 11/06/2026 | Published 30/06/2026

Abstract. The development of early childhood education teachers' creativity is a critical issue in preparing young learners to acquire 21st-century competencies, particularly creative thinking, communication, collaboration, and critical thinking. However, previous studies on strategies for enhancing teacher creativity remain fragmented, creating a need for a systematic synthesis that can guide professional development in early childhood education contexts. This study aims to identify, analyze, and synthesize strategies for developing early childhood education teachers' creativity as a 21st-century skill. This research employed a Systematic Literature Review approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework. The review process consisted of identification, screening, eligibility assessment, and inclusion stages. A total of 72 articles were initially identified from relevant early childhood education journals, and nine articles that met the inclusion criteria were selected for further analysis. The selected articles were examined using content analysis by identifying key findings, classifying recurring themes, and synthesizing strategy patterns related to teacher creativity development. The findings reveal that early childhood education teachers' creativity can be strengthened through continuous professional training, mentoring, creative and contextual learning media, loose parts-based activities, arts integration, STEAM-based learning, project-based play, and empowering leadership. These strategies support teachers in designing innovative, adaptive, meaningful, and child-centered learning experiences. The study concludes that teacher creativity is not merely an individual attribute, but a professional competency that can be systematically developed through pedagogical innovation and institutional support. The novelty of this study lies in its synthesis of scattered empirical findings into an integrated framework aligned with 21st-century competencies. This study contributes to the development of evidence-based references for teacher professional development and creative learning practices in early childhood education.

Keywords: *Early Childhood Education; Teacher Creativity; 21st-Century Skills; Creative pedagogy*

INTRODUCTION

Early childhood represents a fundamental period for learning because children experience rapid and multidimensional development during this stage, including physical, intellectual, social, and emotional growth (Angraini et al., 2019). One developmental aspect that requires particular attention is creativity, which refers to the ability to generate new, original, and valuable ideas, products, or solutions (Nst & Harahap, 2024). Creativity is not merely an act of imitation or repetition, but a complex process through which individuals combine prior experience, knowledge, and imagination to construct new patterns and possibilities (Nurul et al., 2024). In the context of 21st-century education, creativity has become increasingly important because young learners are expected to develop the 4C competencies, particularly creative thinking, critical thinking, communication, and collaboration (Priantika et al., 2024). These competencies begin to develop in early childhood and include problem-solving, self-regulation, cognitive regulation, creativity, and collaborative capacity (Bobrowicz, 2024).

The urgency of strengthening creativity in early childhood education is closely related to the role of teachers in creating meaningful and stimulating learning experiences. When teachers are unable to use learning materials creatively, children tend to lose interest in learning tasks and have fewer opportunities to develop creative thinking (Kade et al., 2021). Therefore, the creativity of early childhood education teachers is essential in teaching and learning activities because it determines how learning environments, materials, and activities are designed to support children's developmental needs (Irawati et al., 2024). Teachers who continue to rely on conventional and traditional learning methods may fail to stimulate children's curiosity and enthusiasm in learning activities (Prathiwi & Setyaningtyas, 2021). Consequently, creativity should not be viewed only as a developmental target for children, but also as a professional attribute that teachers must possess to foster creativity in early childhood learning contexts (Nurani et al., 2024).

Despite the importance of teacher creativity, early childhood education still faces challenges related to teacher competence and professional readiness. Qualified early childhood education teachers are expected to design engaging, meaningful, and effective learning materials and activities while also understanding children's growth and development according to their developmental stages (Novitasari & Fitria, 2021). However, limited professional competence remains a major obstacle to improving the quality of early childhood education. This condition indicates that the main research problem is not only the need to develop children's creativity, but also the need to strengthen teachers' creative capacity as a prerequisite for designing high-quality learning. Without adequate pedagogical creativity, teachers may experience difficulties in adapting learning activities to the characteristics of young children and the demands of contemporary education.

A common solution to this problem is to enhance teacher professionalism through the development of competencies relevant to 21st-century education. In response to changing educational demands, teachers need to cultivate creative and innovative thinking in the teaching and learning process, understand learners' psychological development, develop children's skills, communicate effectively, and possess broad pedagogical knowledge (Rahayu & Muhtar, 2022). Teachers are also required to master the 4C competencies, namely critical thinking, communication, collaboration, and creativity, which are important for improving teacher professionalism, learning quality, and student outcomes (Marmoah et al., 2021). In a broader competency framework, teachers are expected to strengthen the 6C competencies, create a Pancasila-based learning environment, and foster active, creative, and innovative learning (Basri et al., 2023). These six competencies include character, critical thinking, creativity, citizenship, collaboration, and communication (Anggraeni et al., 2022).

Previous studies have proposed several specific solutions for developing teacher creativity through innovative learning approaches. The creativity of early childhood education teachers can be observed in their ability to design and develop innovative, enjoyable, and meaningful learning models that are appropriate to the characteristics of young children (Faizah, 2020). Creative teachers are able to present contextual learning experiences that are closely connected to children's daily lives. In addition, 21st-century education requires teachers to integrate technology into learning and to act as lifelong learners as well as agents of school transformation (Rakhmawati et al., 2024). Learning in the 21st century differs from conventional, traditional, and teacher-centered learning because it emphasizes meaningful, child-centered, active, and independent learning supported by technology as a learning medium (Septiyana et al., 2024).

Other studies have emphasized the importance of digital competence and creative media development as specific strategies for improving teacher creativity. Training early childhood educators in digital skills, particularly in the use of artificial intelligence, is considered important for improving learning methods in the digital era because technologically competent educators can create more flexible and innovative teaching materials that enrich children's learning experiences (Putri et al., 2025). Similarly, Canva has been identified as a digital application that supports the design of creative learning media, with features that can make classroom activities more communicative, visual, and engaging (Wulandari & Mudinillah, 2022). Early childhood education teachers who use Canva as a learning medium have been reported to demonstrate higher creativity than those who do not use such tools (Harmoko Arifin et al., 2024). These findings indicate that creativity development can be supported through professional training, technological integration, and the use of innovative learning media.

Although the literature has discussed teacher creativity, innovative pedagogy, technology-based learning, and professional development, the existing studies remain relatively fragmented. Many studies focus on children's creativity, individual teacher characteristics, or specific learning media, while fewer studies systematically examine strategies for developing early childhood education teachers' creativity within the framework of 21st-century skills. In particular, literature that synthesizes creativity development strategies in relation to the 4C competencies remains limited. This gap creates a need for a systematic review that can organize diverse findings into a coherent conceptual and practical framework for strengthening teacher creativity in early childhood education.

In response to this gap, this study offers a systematic synthesis of strategies for developing early childhood education teachers' creativity as a 21st-century skill. The novelty of this study lies in its focus on integrating previous research findings into a structured framework that connects teacher creativity development with 21st-century competencies, particularly the 4C

framework. The scope of this study is limited to previous scientific studies that examine strategies for developing creativity among early childhood education teachers, including training, creative learning media, technology integration, arts-based learning, STEAM-oriented approaches, and institutional support. This focus is justified by the assumption that teacher creativity is not merely an innate personal trait, but a professional competency that can be developed through systematic pedagogical, technological, and organizational interventions.

This study aims to identify and analyze strategies for developing early childhood education teachers' creativity as a 21st-century skill based on previous research. Specifically, this study seeks to answer the following research questions: first, what strategies have been used to develop the creativity of early childhood education teachers? Second, how do these strategies contribute to strengthening 21st-century skills in the context of early childhood education? Through these questions, this study is expected to provide a comprehensive evidence-based synthesis that can support teacher professional development and strengthen creative, innovative, and child-centered learning practices in early childhood education.

RESEARCH METHODS

Research Design and Approach

This study employed a literature review design using the Systematic Literature Review (SLR) approach. The SLR approach was selected because it provides a systematic, transparent, and replicable procedure for identifying, selecting, analyzing, and synthesizing previous research findings related to a specific research problem. In this study, the SLR method was used to address the research problem by systematically examining strategies for developing early childhood education teachers' creativity as a 21st-century skill. The review procedure was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework, which includes identification, screening, eligibility assessment, and inclusion stages (Norlita et al., 2023).

This study used a qualitative-descriptive approach because the data were obtained from previously published scientific articles and analyzed through thematic interpretation. The purpose of this approach was to identify patterns, classify research findings, and synthesize various strategies that have been used to develop the creativity of early childhood education teachers. Therefore, the analysis focused not only on describing previous studies but also on constructing a systematic synthesis of strategies relevant to teacher creativity and 21st-century skills.

Research Subjects and Data Sources

The research subjects in this study were peer-reviewed scientific journal articles related to strategies for developing early childhood education teachers' creativity. The data sources

consisted of articles published in national journals indexed by SINTA, particularly journals relevant to early childhood education. The literature search was conducted through several journal sources, namely Murhum: Journal of Early Childhood Education, Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, Undiksha Journal of Early Childhood Education, UIN Sunan Kalijaga Journal, and Jakarta State University Journal. All articles were accessed online through the official websites of the respective journals.

The review focused on articles published between 2019 and 2025 and written in Indonesian or English. The main keyword used in the article search was “teacher creativity.” This keyword was selected because it directly reflects the central focus of the study, namely creativity development among early childhood education teachers. The initial search identified 72 articles. After the screening, eligibility assessment, and inclusion process, nine articles met the inclusion criteria and were selected as the primary data sources for further analysis.

Materials and Research Instruments

The materials used in this study consisted of full-text scientific articles that met the inclusion criteria. The instruments used in the review process included an article selection matrix and a data extraction sheet. The article selection matrix was used to classify the articles based on publication type, research focus, availability of full text, publication year, language, journal accreditation, and relevance to early childhood education teachers. The data extraction sheet was used to record important information from each article, including author name, year of publication, journal source, research title, research objectives, research methods, main findings, and strategies for developing teacher creativity.

These instruments were used to support a systematic and consistent review process. Each selected article was examined carefully to identify findings related to professional training, creative learning media, loose parts-based learning, arts integration, STEAM-based learning, project-based play, mentoring, and leadership support as strategies for developing teacher creativity.

Inclusion and Exclusion Criteria

The selection of articles was based on predetermined inclusion and exclusion criteria. These criteria were used to ensure that the articles analyzed were relevant to the research objectives and capable of answering the research questions.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed scientific journal articles	Opinion articles without empirical data or non-academic sources

Articles focusing on early childhood education teachers	Articles focusing on teachers outside early childhood education, such as elementary, secondary, or higher education teachers
Articles analyzing strategies for developing early childhood education teachers' creativity	Studies that do not explicitly discuss creativity development strategies for early childhood education teachers
Articles published between 2019 and 2025	Articles published outside the predetermined publication period
Articles written in Indonesian or English	Articles written in languages other than Indonesian or English
Articles available in full-text format	Articles not available in full-text format
Articles published in SINTA 2 and SINTA 3 early childhood education journals	Articles not published in relevant SINTA 2 or SINTA 3 early childhood education journals

Data Collection Procedure

Data were collected through documentation study by gathering secondary data from scientific articles published in relevant early childhood education journals. The literature search was conducted online by accessing the official websites of selected journals. The search process began by entering the keyword “teacher creativity” into the search facilities of each journal database. Articles identified through this process were then recorded and organized according to journal source, publication year, title, and relevance to the research topic.

The article collection procedure followed the SLR stages based on the PRISMA framework. In the identification stage, articles related to teacher creativity were collected from the selected journal databases. In the screening stage, the titles and abstracts of the identified articles were reviewed to determine their relevance to the focus of this study. Articles that were not related to early childhood education teachers or did not discuss creativity development strategies were excluded. In the eligibility stage, articles that passed the initial screening were examined through full-text review. Articles that were inaccessible, irrelevant, or inconsistent with the inclusion criteria were eliminated. In the inclusion stage, articles that fulfilled all criteria were selected as the final data sources for analysis.

Based on this procedure, 72 articles were identified in the initial search. These articles consisted of 33 articles from *Murhum: Journal of Early Childhood Education*, 22 articles from *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, five articles from *Undiksha Journal of Early Childhood Education*, five articles from *UIN Sunan Kalijaga Journal*, and seven articles from *Jakarta State University Journal*. After the title and abstract screening process, 15 articles were considered potentially eligible. Full-text assessment was then conducted, and five articles were excluded because they were irrelevant to the research focus. Finally, nine articles met all inclusion criteria and were analyzed in this study. The article selection process is presented in Figure 1.

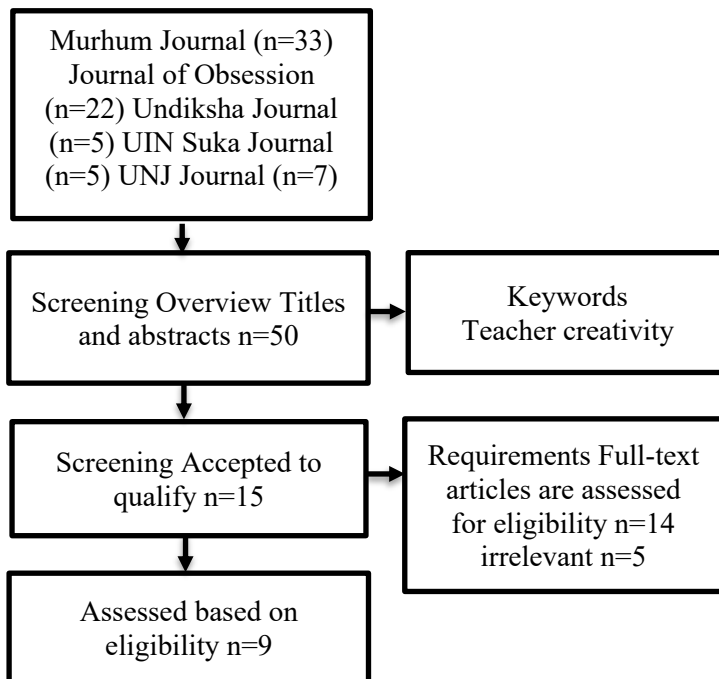


Figure 1. Prism Flow

Data Analysis Technique

The data analysis technique used in this study was content analysis. Content analysis was applied to examine the selected articles systematically and to identify key findings related to strategies for developing early childhood education teachers' creativity. The analysis began by reading each selected article thoroughly to understand its objectives, methods, findings, and implications. Important information from each article was then extracted and organized in a synthesis table.

After the data extraction process, the findings were grouped into thematic categories based on similarities in strategy and implementation. The main themes identified included teacher training and professional development, creative learning media, loose parts-based learning, arts integration, STEAM-based learning, project-based play, mentoring, and empowering leadership. These themes were then analyzed to identify patterns, relationships, and contributions to 21st-century skills, particularly creativity, critical thinking, collaboration, and communication.

The results of the analysis were synthesized descriptively in narrative form and supported by a research summary table. This synthesis aimed to provide a systematic overview of various strategies used to develop early childhood education teachers' creativity and to explain how these strategies contribute to strengthening 21st-century learning in early childhood education contexts.

Data Validity and Trustworthiness

Data validity in this study was maintained through several procedures. First, the review process used explicit inclusion and exclusion criteria to ensure that only relevant and credible articles were selected. Second, the article selection procedure followed the PRISMA framework, which improved transparency in the identification, screening, eligibility, and inclusion stages. Third, full-text review was conducted to ensure that each selected article directly addressed the research focus.

Trustworthiness was strengthened through systematic data extraction and thematic categorization. Each article was analyzed using the same extraction components, including author, year, journal source, research title, research objectives, methods, and main findings. The findings were then compared across articles to identify consistent themes and recurring patterns. This procedure helped reduce subjective interpretation and ensured that the synthesis was grounded in the selected literature. Through these procedures, this study produced a reliable and evidence-based synthesis of strategies for developing early childhood education teachers' creativity as a 21st-century skill.

RESULTS

The systematic literature review identified 72 articles related to teacher creativity in early childhood education. After the screening, eligibility assessment, and inclusion stages, nine articles met the inclusion criteria and were selected for further analysis. These articles were published between 2022 and 2025 and directly addressed the research questions concerning strategies for developing early childhood education teachers' creativity as a 21st-century skill. The selected studies were published in three major early childhood education journals, namely *Murhum: Journal of Early Childhood Education*, *Jurnal Obsesi: Journal of Early Childhood Education*, and *Undiksha Early Childhood Education Journal*.

The distribution of the selected articles indicates that research on early childhood education teacher creativity has received increasing attention in recent years. Four articles were published in *Murhum: Journal of Early Childhood Education*, four articles were published in *Jurnal Obsesi: Journal of Early Childhood Education*, and one article was published in *Undiksha Early Childhood Education Journal*. Most of the studies focused on early childhood education teachers as the main research subjects and examined strategies such as teacher training, arts integration, STEAM-based learning, loose parts media, project-based play, creative pedagogy, and empowering leadership.

Table 2. Synthesis of Main Findings

No.	Author (Year)	Journal Source	Research Title	Main Research Findings
1	Martini et al. (2025)	Murhum: Journal of Early Childhood Education	Dance Arts Integration as a Learning Innovation to Improve the Professional Competence of Early Childhood Education Educators	The integration of dance into learning improved teachers' ability to design creative learning activities, increased children's engagement, and created more enjoyable learning experiences.
2	Istifadah et al. (2024)	Murhum: Journal of Early Childhood Education	Simple Songwriting Training to Develop the Creativity of Early Childhood Education Teachers	Simple songwriting training enhanced teachers' understanding of music theory and strengthened their creative potential in composing songs for learning activities.
3	Nisak Aulina et al. (2024)	Murhum: Journal of Early Childhood Education	Mentoring for STEAM-Q-Based Learning Development for Early Childhood Education Teachers	STEAM-Q-based mentoring improved teachers' competence in designing teaching modules that integrate science, technology, engineering, arts, mathematics, and Qur'anic values.
4	Eka Nurjanah et al. (2024)	Murhum: Journal of Early Childhood Education	Teachers' Perceptions of Creative Pedagogy: A Narrative Study of Independent Curriculum Practices in Preschool Education	Teachers perceived creative pedagogy as essential in the implementation of the Independent Curriculum, and its development was supported through independent training and learning platforms.
5	Purwajatnika and Kadiyono (2022)	Jurnal Obsesi: Journal of Early Childhood Education	The Influence of Empowering Leadership on Employee Creativity in Early Childhood Education Teachers	Empowering leadership had a significant positive influence on teacher creativity by providing trust, autonomy, and support for innovation.
6	Asih et al. (2022)	Jurnal Obsesi: Journal of Early Childhood Education	Loose Parts Media Center Learning Enhances Kindergarten Teachers' Creativity and Pedagogical Competence	Center-based learning using loose parts media was effective in improving teachers' creativity and pedagogical competence.
7	Roostin et al. (2022)	Jurnal Obsesi: Journal of Early Childhood Education	Traditional Dakuca Game Media Training for Raudathul Athfal	Traditional game media training encouraged teachers to develop creative learning media based on local

		Childhood Education	Teachers in Sumedang Regency	wisdom, particularly through the creation of Bocer or Cheerful Ball media.
8	Masnipal (2022)	Jurnal Obsesi: Journal of Early Childhood Education	Contribution of Training in Improving Teachers' Skills in Guiding Students in Playing with Blocks	Training in the Constructive Play Creativity Development model improved teachers' skills in designing engaging, meaningful, and enjoyable block-play scenarios.
9	Yus et al. (2024)	Undiksha Early Childhood Education Journal	Kindergarten Teachers' Perspectives on Play-Based Project Learning with the Playworld Approach	Teachers still experienced difficulties in integrating play-based project learning, as reflected in the creativity score of 34.48%, indicating the need for further training and mentoring.

Thematic Classification of Creativity Development Strategies

The content analysis of the nine selected articles revealed five dominant strategy categories for developing early childhood education teachers' creativity. These categories include professional training and mentoring, creative learning media, arts integration, STEAM-based learning, and empowering leadership. Each category contributes differently to strengthening teachers' creative capacity and their ability to design innovative, adaptive, and child-centered learning activities.

Table 3. Thematic Classification of Strategies for Developing Teacher Creativity

Main Strategy	Forms of Implementation	Related Studies	Contribution to Teacher Creativity
Professional training and mentoring	Songwriting training, traditional game media training, constructive play training, independent training, STEAM-Q mentoring	Istifadah et al. (2024), Roostin et al. (2022), Masnipal (2022), Eka Nurjanah et al. (2024), Nisak Aulina et al. (2024)	Improves teachers' creative skills, strengthens pedagogical confidence, and supports the development of innovative learning activities.
Creative and contextual learning media	Loose parts media, local wisdom-based media, block-play scenarios, digital and creative learning resources	Asih et al. (2022), Roostin et al. (2022), Masnipal (2022)	Encourages teachers to design flexible, meaningful, and engaging learning experiences using available materials and contextual resources.
Arts integration	Dance-based learning and simple songwriting	Martini et al. (2025), Istifadah et al. (2024)	Enhances teachers' ability to integrate artistic expression into learning and increases children's participation and enjoyment.

STEAM-based learning	STEAM-Q development integration of multidisciplinary learning elements	module and of	Nisak Aulina et al. (2024)	Strengthens teachers' ability to design interdisciplinary learning that integrates science, technology, engineering, arts, mathematics, and values.
Empowering leadership and institutional support	Autonomy, trust, support for innovation, professional learning platforms		Purwajatnika and Kadiyono (2022), Eka Nurjanah et al. (2024)	Builds a supportive environment that enables teachers to experiment, innovate, and develop creative pedagogical practices.
Project-based play	Playworld approach and play-based learning	and project	Yus et al. (2024)	Provides opportunities for creative learning design, although teachers still require further support to implement this approach effectively.

The findings show that teacher creativity is developed not through a single intervention but through a combination of pedagogical, artistic, technological, material-based, and institutional strategies. Training and mentoring appeared as the most frequently identified strategies because they were reported in several studies and were directly related to improving teachers' practical skills. Creative learning media, particularly loose parts and local wisdom-based media, also emerged as important tools for stimulating teachers' creativity in designing contextual learning activities. Meanwhile, arts integration and STEAM-based approaches supported interdisciplinary and expressive forms of learning. Empowering leadership functioned as an enabling factor that encouraged teachers to take initiative, experiment with new methods, and develop creative teaching practices.

Conceptual Summary of Findings

The results of the thematic synthesis indicate that strategies for developing early childhood education teachers' creativity can be organized into an integrated conceptual framework. This framework shows that teacher creativity is influenced by three interconnected dimensions: professional development, pedagogical innovation, and institutional support. Professional development includes training, mentoring, and independent learning. Pedagogical innovation includes creative learning media, arts integration, STEAM-based learning, loose parts media, and project-based play. Institutional support includes empowering leadership, autonomy, and a school culture that supports innovation.

Table 4. Concept Map of Research Findings

Strategic Dimension	Main Strategy	Expected Competency	Teacher	Contribution to 21st-Century Skills
Professional Development	Training, mentoring, independent learning	Creative lesson planning, reflective pedagogical confidence	practice,	Creativity, communication, collaboration
Pedagogical Innovation	Loose parts media, arts integration, STEAM, project-based play	Innovative learning design, interdisciplinary teaching, contextual learning		Creativity, critical thinking, problem-solving
Institutional Support	Empowering leadership and professional support systems	Autonomy, innovation, professional motivation		Collaboration, communication, creativity

The conceptual map demonstrates that creativity development among early childhood education teachers requires the integration of individual capacity building, innovative learning approaches, and supportive institutional conditions. Training and mentoring strengthen teachers' knowledge and skills, while creative media, arts, STEAM, and project-based play provide practical pathways for implementing creative pedagogy. Leadership support strengthens these efforts by providing autonomy, encouragement, and an environment that allows teachers to innovate. Therefore, the development of teacher creativity as a 21st-century skill should be understood as a systematic and multidimensional process rather than as an isolated personal attribute.

Overall, the findings answer the two research questions of this study. First, the strategies used to develop early childhood education teachers' creativity include professional training, mentoring, creative learning media, arts integration, STEAM-based learning, loose parts media, project-based play, and empowering leadership. Second, these strategies contribute to strengthening 21st-century skills by enabling teachers to design learning activities that promote creativity, collaboration, communication, critical thinking, active participation, and child-centered learning in early childhood education contexts.

DISCUSSION

Teacher Training and Professional Development as Foundations for Creative Competence

The findings of this study indicate that teacher training and professional development constitute the most frequently identified strategies for developing the creativity of early childhood education teachers. This finding is consistent with the theoretical position that teacher creativity is not only an innate personal disposition, but also a professional competency that can be strengthened through systematic learning, reflective practice, and continuous pedagogical renewal. In the context of 21st-century education, teachers are required to develop creativity,

critical thinking, communication, and collaboration as essential competencies for improving learning quality and student outcomes (Marmoah et al., 2021). Therefore, professional development should be understood as a strategic mechanism for transforming teachers from routine implementers of curriculum into creative designers of meaningful learning experiences.

The results of this review show that training programs have a direct contribution to improving teachers' ability to design creative learning activities. Istifadah et al. (2024) demonstrated that simple songwriting training improved teachers' understanding of music theory and enhanced their creative capacity to compose songs for early childhood learning. Similarly, Masnipal (2022) found that training in the Constructive Play Creativity Development model improved teachers' skills in designing attractive and enjoyable block-play scenarios. Roostin et al. (2022) also reported that traditional game media training encouraged teachers to create local wisdom-based learning media, particularly through the development of Bocer or Cheerful Ball media. These studies collectively confirm that training becomes effective when it provides teachers with practical, applicable, and contextually relevant pedagogical tools.

These findings are also supported by broader studies on teacher professional development. Training in learning media development, especially through the use of simple and environmentally available materials, has been shown to improve teachers' ability to produce diverse and contextual learning resources (Samad et al., 2024). Training and simulation activities also provide teachers with new inspiration, strengthen their confidence, and help them develop innovative learning methods that are appropriate for children's developmental characteristics (Eva Manfaatin et al., 2025). In addition, professional training enhances teachers' competence in designing innovative activities, creating stimulating classroom environments, and managing learning more effectively (Hifza et al., 2023). These findings reinforce the author's position that teacher creativity should be developed through continuous, practice-oriented, and needs-based professional development rather than through isolated or one-time training programs.

The results further suggest that continuous professional development should be supported by teacher collaboration, self-directed learning, and access to relevant resources. Nur Ismiatun et al. (2025) emphasized that teachers can strengthen their creativity through training, peer discussion, and learning from books and internet-based resources. Zainab et al. (2024) also showed that training in making reading cards from recycled materials can inspire teachers to develop creative learning tools through meaningful and relevant activities. This aligns with Adjei (2023), who recommends ongoing professional development as an important step in helping early childhood education teachers understand the value of creativity and become more creative classroom practitioners. Accordingly, this study argues that professional development for early

childhood education teachers should be designed as a continuous ecosystem that integrates training, mentoring, peer collaboration, and reflective practice.

Creative Learning Media and Contextual Pedagogy

The second major finding of this study is that the use of creative learning media plays a crucial role in developing teachers' creativity. Learning media function not merely as instructional aids, but as pedagogical instruments that enable teachers to construct meaningful, interactive, and developmentally appropriate learning experiences. In early childhood education, where children learn through play, exploration, and sensory engagement, teachers' ability to transform available materials into meaningful learning media is central to creative pedagogy. This finding supports the view that creative teachers are those who can design learning models and media that are enjoyable, meaningful, and aligned with the characteristics of young children (Faizah, 2020).

The findings indicate that loose parts media are particularly significant in strengthening both creativity and pedagogical competence. Asih et al. (2022) reported that center-based learning using loose parts media effectively improved kindergarten teachers' creativity and pedagogical competence. Loose parts provide flexible materials that can be manipulated, combined, redesigned, and interpreted in multiple ways. This flexibility allows teachers to create open-ended learning situations that stimulate children's imagination and problem-solving abilities. Damayanti et al. (2020) explained that loose parts support game-based learning by allowing children to freely explore various educational materials. Yuliani et al. (2024) further emphasized that loose parts derived from natural environmental materials can encourage creativity in early childhood learning.

The use of creative media also strengthens contextual pedagogy because teachers are encouraged to use materials that are familiar, accessible, and relevant to children's daily lives. Ajat et al. (2023) showed that teachers' knowledge of loose parts and sub-materials can support interactive and enjoyable learning experiences. This finding confirms that creative media development is closely related to teachers' ability to connect classroom learning with the surrounding environment. In this sense, the development of teacher creativity does not always depend on expensive or sophisticated resources. Instead, it can be achieved by strengthening teachers' capacity to reinterpret simple, local, natural, and recycled materials as meaningful learning tools.

Project-based learning also emerged as an important strategy for developing creative tendencies among early childhood education teachers. Ling and Huang (2025) provided empirical support for project-based learning as an effective instructional strategy for systematically enhancing creative tendencies among pre-service early childhood teachers in a picture book

design course. Their findings highlight the importance of learner-centered participation, problem-solving, and creative expression in teacher education. This is relevant to the findings of the present study because project-based learning provides teachers with opportunities to design extended, inquiry-oriented, and collaborative learning activities. Therefore, the author argues that creative learning media should be integrated with project-based and play-based approaches so that teachers can develop not only creative products but also creative pedagogical processes.

Arts Integration and STEAM-Based Learning as Multidisciplinary Strategies

The findings of this study also show that arts integration and STEAM-based learning are important strategies for developing early childhood education teachers' creativity. These findings are consistent with the principle that early childhood learning should be holistic, expressive, exploratory, and connected to children's natural modes of learning. Arts-based learning allows teachers to integrate movement, rhythm, visual expression, storytelling, music, and imagination into classroom activities. Martini et al. (2025) found that dance integration improved teachers' ability to design learning, encouraged creativity, increased children's engagement, and created enjoyable learning experiences. This indicates that art is not merely an additional activity in early childhood education, but a central medium for developing creative pedagogy.

Arts integration is theoretically relevant because young children learn through embodied, emotional, social, and symbolic experiences. Egamkulovna and Isamaddinovna (2025) emphasized that the integration of different art forms, such as combining drawing with storytelling or dancing with painting, can strengthen children's emotional engagement and holistic learning experiences. This perspective supports the findings of the present study by showing that teachers' creativity can be enhanced when they are encouraged to design cross-modal learning experiences. Katungi et al. (2023) also found that the Art World Design Thinking Process was positively associated with teachers' creative use of materials, indicating that teachers can develop personal creativity and use learning materials more imaginatively when equipped with design-oriented pedagogical skills.

In addition to arts integration, STEAM-based learning emerged as a major strategy for strengthening teacher creativity. Nisak Aulina et al. (2024) showed that STEAM-Q-based mentoring improved teachers' competence in designing teaching modules that integrate science, technology, engineering, arts, mathematics, and Qur'anic values. This finding demonstrates that STEAM can support interdisciplinary thinking and encourage teachers to design learning activities that integrate multiple domains of knowledge. Pramudyani and Indratno (2022) explained that STEAM is a learning approach developed in early childhood education, while Supriyanto et al. (2025) emphasized that STEAM requires teachers to think flexibly and creatively

when designing learning activities. Therefore, STEAM is not only a curriculum model but also a professional creativity framework for teachers.

The significance of STEAM-based learning is further supported by Fardinah et al. (2025), who reported improvements in conceptual understanding, innovative activity design, and active participation in learning simulations through STEAM-based activities. Rahma et al. (2023) also emphasized the importance of implementing STEAM learning through loose parts activities to enhance educators' creativity in designing learning experiences. These findings indicate that STEAM and loose parts can complement each other because both encourage exploration, design, experimentation, creativity, and problem-solving. The author's position is that STEAM-based learning should be developed as an integrated pedagogical approach in early childhood teacher professional development, particularly when combined with arts, loose parts, and project-based play.

Empowering Leadership and Institutional Support for Teacher Creativity

The findings also reveal that teacher creativity is influenced by institutional factors, particularly leadership support. Purwajatnika and Kadiyono (2022) demonstrated that empowering leadership significantly influenced early childhood education teachers' creativity. This finding suggests that creativity is not developed solely at the individual teacher level. It also depends on whether the school environment provides autonomy, trust, encouragement, and opportunities for innovation. Empowering leadership supports teachers by allowing them to experiment with new ideas, make pedagogical decisions, and develop ownership of learning innovations.

This finding is consistent with broader studies on educational leadership and teacher performance. Visionary leadership can guide and motivate teachers to think creatively and overcome educational challenges (Sukri Situmeang et al., 2025). Rini Syarifah and Santi (2025) found a positive and significant relationship between principal leadership style and teacher performance in teaching competence and learning media creation. Lesmi et al. (2025) also showed that principal leadership can improve teacher performance through discipline, motivation, and recognition. These findings collectively demonstrate that institutional leadership functions as an enabling condition for teacher creativity because it shapes the organizational climate in which teachers work.

Creative pedagogy is also closely related to curriculum implementation. Eka Nurjanah et al. (2024) found that teachers perceive creative pedagogy as an essential aspect of implementing the Independent Curriculum and that creativity can be developed through self-paced training and learning platforms. This finding indicates that teacher creativity is inseparable from curriculum

reform, professional autonomy, and access to learning resources. However, Yus et al. (2024) found that teachers still experienced difficulties in integrating play-based project learning with the Playworld approach, as reflected in a creativity score of 34.48%. This finding highlights an important challenge. Although teachers may recognize the importance of creative pedagogy, they still require structured support, practical examples, mentoring, and institutional facilitation to implement it effectively.

Pedagogical competence also determines the effectiveness of creative learning implementation. Nuzulliya et al. (2025) explained that preschool teachers' pedagogical competence is crucial in implementing center-based learning because teachers must understand children's characteristics, design appropriate lesson plans, manage active learning, and observe children's development. Maknun et al. (2023) also emphasized that principal leadership influences teacher performance, indicating that institutional leadership can directly affect the quality of learning implementation. Based on these findings, the author argues that leadership support should be integrated with pedagogical mentoring so that teachers not only receive motivation and autonomy, but also obtain concrete instructional guidance for designing creative learning.

The overall findings of this study indicate that the development of early childhood education teachers' creativity requires an integrated strategy involving professional development, creative media use, arts and STEAM integration, project-based play, and institutional support. These findings are aligned with the 21st-century skills framework, which emphasizes creativity, critical thinking, communication, and collaboration as core competencies for both teachers and learners (Marmoah et al., 2021). They are also consistent with the broader 6C framework, which includes character, critical thinking, creativity, citizenship, collaboration, and communication (Anggraeni et al., 2022). Thus, the results confirm that teacher creativity is a strategic professional competence that supports the transformation of early childhood education toward more active, meaningful, adaptive, and child-centered learning.

The author's position is that teacher creativity should be treated as a developable professional competency rather than as a fixed personal characteristic. The evidence reviewed in this study shows that teachers become more creative when they receive relevant training, access to flexible learning media, opportunities to integrate arts and STEAM, support for project-based play, and encouragement from empowering leaders. Therefore, creativity development should not be left to individual initiative alone. It should be embedded in institutional programs, teacher professional development systems, school leadership practices, and curriculum implementation strategies.

Several practical recommendations can be derived from these findings. First, early childhood education institutions should provide continuous training and mentoring focused on creative pedagogy, loose parts media, STEAM learning, arts integration, and project-based play. Second, school leaders should create an empowering climate by giving teachers autonomy, professional trust, opportunities for experimentation, and recognition for innovation. Third, teacher education programs should integrate creative media design, digital competence, project-based learning, and reflective practice into their curriculum. Fourth, policymakers should support professional development programs that are sustainable, practice-based, and relevant to the needs of early childhood education teachers. Finally, future implementation should emphasize collaboration among teachers, school leaders, parents, and communities so that creative learning can be strengthened through both classroom and environmental resources.

In conclusion, the discussion confirms that strategies for developing early childhood education teachers' creativity are multidimensional and mutually reinforcing. Training strengthens knowledge and confidence, creative media provide practical tools for innovation, arts and STEAM expand interdisciplinary pedagogy, project-based play encourages inquiry and imagination, and empowering leadership creates the institutional conditions needed for sustainable creativity. This integrated perspective provides a stronger basis for improving early childhood education teacher professionalism and for preparing learning environments that support children's 21st-century competencies.

CONCLUSION

This study concludes that the development of early childhood education teachers' creativity as a 21st-century skill requires a planned, systematic, and institutionally supported approach. Based on the synthesis of selected literature, the main strategies identified include continuous professional training, structured mentoring, the use of creative and contextual learning media, loose parts-based learning, STEAM-oriented instruction, arts integration, project-based play models, and empowering leadership. These strategies contribute to strengthening teachers' professional competencies, particularly creativity, critical thinking, collaboration, and communication, which are essential for designing innovative, adaptive, meaningful, and child-centered learning experiences.

The key implication of these findings is that teacher creativity should not be viewed merely as an individual talent, but as a professional competency that can be developed through pedagogical innovation, reflective practice, and supportive school leadership. This study contributes to the existing body of knowledge by synthesizing fragmented findings into an integrated framework for developing early childhood education teachers' creativity within the

context of 21st-century learning. Practically, the findings provide evidence-based guidance for teacher education institutions, school leaders, and policymakers in designing professional development programs for early childhood educators. Future research is recommended to conduct empirical, experimental, and longitudinal studies to validate the effectiveness of this integrated strategy model across diverse early childhood education settings.

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