Enhancing Creative Thinking in Preschoolers: Teacher Strategies for Creating a Multiliteracy-Based Learning Environment

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ABSTRACT: The preschool period is an important phase of child development, which includes cognitive aspects, especially in terms of growth and creative thinking, but many teachers still use conventional learning strategies. This study aimed to investigate effective teacher strategies for improving creative thinking in preschool children in a multiliteracy-based learning environment. The research method used a qualitative approach with a multisite case study research involving a kindergarten school. The informants were selected using a purposive sampling technique involving nine informants, including teachers, assistant teachers, and school principals. The research findings show that implementing the strategy steps can create a dynamic and creative learning environment that supports literacy development in various contexts. Factors such as competent teachers, access to re-sources and management of barriers shape an effective multiliteracy environment. The positive impact motivates students to continue thinking creatively and exploratively. The multiliteracies approach enhances preschoolers' creativity through purposeful strategies, teacher collaboration, resource support and the use of diverse media, which empowers literacy in education.

Keywords: creative thinking, multiliteracy, teacher, preschoolers

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1 INTRODUCTION

Creative thinking in preschool children is an aspect that plays a key role in their development (Nikkola et al., 2022). Creative thinking forms the basis of children's intellectual development, provides the foundation for deep problem solving, and stimulates the development of a wide range of cognitive skills (Tang et al., 2020). Research shows that children who are able to think creatively tend to be more adaptable when dealing with new and complex situations (Richard et al., 2018). Moreover, creative thinking also plays a crucial role in enhancing children's creativity, which is positively correlated with academic achievement and social-emotional development (Yildiz & Yildiz, 2021). Therefore, it is important for educators and parents to recognize and develop children's creative thinking skills as an integral part of their educational process (Yafie et al., 2023).

Creative thinking can be inhibited if the learning environment lacks stimulation and a rigid curriculum is implemented (Yildiz & Yildiz, 2021). Education that focuses too much on test scores and academic pressure can inhibit children's creative thinking (Shah & Gustafsson, 2021). In addition, a lack of appreciation for the diversity of ideas and exploratory thinking of preschool children can also hinder the development of creative thinking (Scott-Barrett et al., 2023). The creativity of Indonesian children is among the lowest compared to other countries in the world. The Global Creativity Index (GCI) 2023 ranked Indonesia 150th out of 160 countries. This is supported by a study conducted by the Population and Environment Research Center of the University of Indonesia (LPEM UI) in 2022, which surveyed 1,000 young children in different regions of Indonesia and found that 58.3% of children had low levels of creativity. Children who lack creative thinking skills tend to experience barriers in complex problem solving and critical thinking skills (O'Reilly et al., 2022).

A lack of creative thinking skills can have a negative impact on their academic performance. In addition, children's inability to think creatively can limit their ability to explore innovative solutions to problems (Evans, 2020). In the long run, it also affects children's cognitive and social skills (Bergen et al., 2017). Creative thinking skills are an important foundation for solving complex and innovative problems (Qadri et al., 2019). Lack of creative thinking skills also affects children's ability to adapt to environmental changes and situations that require creative solutions (Behnamnia et al., 2020). Therefore, efforts to promote and develop children's creative thinking skills should be considered an important aspect of learning to support their holistic development.

Multiliteracy-Based Learning Environments is an educational approach that aims to improve children's creative thinking skills through the integration of different literacies, such as traditional literacy (reading and writing), digital literacy (using technology and media), visual literacy (understanding images and visuals), numeracy (math skills), scientific literacy (understanding scientific concepts), and social literacy (the ability to interact with others). The main goal of this approach is to develop children's ability to think creatively, communicate, and collaborate in different contexts. Papadopoulos &

Bisiri (2020) describe a program that uses multiliteracies and cross-cultural storytelling to develop critical thinking skills in preschool children. Do et al., (2023) discussed the importance of creating a constructive classroom environment that encourages problem solving. However, these studies lacked a focus on how teachers can create a multiliteracies-based learning environment that can effectively enhance preschoolers' creative thinking.

Several previous studies have demonstrated the effectiveness of various methods in enhancing creative thinking in preschool children. Research conducted by Surur et al., (2023) highlighted the use of robotics activities in improving children's creative thinking skills. Xiong et al., (2022) offered a digital-based educational game, while Wijayanto et al., (2023) focused on article reviews and a problem-based approach. These studies, which homed in on different aspects of creative thinking such as fluency, flexibility, originality, and elaboration, all share a common thread-the importance of early childhood interventions tailored to different age groups in maximizing the development of creative thinking skills. This research, therefore, is a significant addition to the existing body of knowledge in this field.

Empirically, the research conducted by Xiong et al., (2022) used digital educational game interventions, while the research by Wijayanto et al., (2023) used a problem-based learning model. At the same time, the novelty of this study involves the development of the concept of creative thinking in preschool children with a focus on the influence of multiliteracy-based environments on preschool children's creative thinking. Methodologically, the previous study conducted by Surur et al., (2023) used research with the Single Subject Design (SSD) method with data collection techniques using a pre-test and post-test experimental research design without clear controls. The research used qualitative data collection techniques, such as semi-structured interviews, observation, and documentation studies. In context, research by Xiong et al., (2022) was conducted using 102 children aged 3-6 years. At the same time, this study uses informants directly involved in implementing learning in a kindergarten school environment, totaling nine informants.

Preschoolers' creative thinking is indispensable because they will grow and develop amid a rapidly changing world. Meanwhile, the situation in the field shows that teachers still use conventional learning strategies. In addition, the importance of a multiliteracy-based learning environment cannot be ignored; it can help preschoolers develop various skills that support creative thinking, such as communication, problem-solving and collaboration. This study aims to investigate effective teacher strategies in enhancing creative thinking in preschool children in multiliteracy-based learning environments and identify factors that can contribute to the successful implementation of teacher strategies in improving creative thinking skills in preschool children. Thus, the results of this study are expected to provide valuable recommendations for teachers in creating a learning environment that supports the development of creative thinking in multiliteracy-based preschool children.

2 THEORETICAL STUDY

2.1 *Creative Thinking*

The ability to think creatively is very important for human resource competencies to improve universal competitiveness. Creative thinking is one of the main assets in the ability to solve problems. Creative thinking is the ability to find new ideas so that they can be used as solutions, changes, and innovations to a situation (Villegas et al., 2021). Rosen et al. (2020) define creative thinking to produce products in the form of new ideas that are useful not just a process. Someone who has Creative thinking will observe the situation from a different perspective by considering various details so as to present ideas that are not common (Gube & Lajoie, 2020). Creative thinking includes an innovative problem-solving process, from analyzing facts, brainstorming, to involving people around. Creative thinking can be done by anyone who has the desire to bring about change and decisions. Along with the progress of the times and the digital era, the need for human resources who can think creatively is getting higher. This is because a creative person is able to adapt quickly, be able to deal with various situations, and solve problems well (Villegas et al., 2021). This phenomenon makes the ability to think creatively a very important factor in determining a person's quality of life.

There are various teaching methods and strategies that can improve students' thinking skills such as Problem-based learning, blended learning, and CORE (Saregar et al., 2021). After the process of implementing the learning method goes well, the teacher determines the level of students' creative thinking based on the indicators that have been achieved to be able to see how significant the effect of a teaching method or strategy is on children's creative thinking. Based Torrance, (1968) there are 4 dimensions of creative thinking, namely proficiency in generating ideas (fluency), production of unusual ideas (originality), being able to explain something in detail (elaboration), and being able to produce diverse ideas and ideas (flexibility). These dimensions are also linear with indicators from Trisnayanti et al., (2019).

2.2 *Multiliteracy-Based Learning Environment*

Multiliteracy is a pedagogical concept that allows learners to understand various forms of media use, culture, and context in learning texts (Untari, 2017). By doing so, their knowledge becomes broader by involving various scientific and social aspects. Theoretically, Kulju et al. (2018) believe that multiliteracy pedagogy is also related to the social concept in linguistics which aims to expand one's knowledge in interpreting the concept of text in which there are social practices. Therefore, to understand the application of multiliteracies and its role in school teaching, this concept is understood as a shift and change in the context of reading. This happens because rapid social, technological, cultural and economic developments can affect the use of texts and perspectives on literacy (Kulju et al., 2018; Nopilda & Kristiawan, 2018).

In order for the application of multiliteracy in the learning and teaching process to run well, it requires an adequate environment and facilities because multiliteracy learning

refs to the aspects of multicontext, multicultural, and multimedia (Selayani & Bayu, 2023). Loyola et al. (2020), stated that a supportive learning environment is one of the important factors in the application of multiliteracies to develop students' thinking processes by integrating technology. This is also in line with the findings of Nuryani et al., (2019), which show that a learning environment with a multiliteracy pedagogical model can improve critical and creative thinking skills for students. It is important to remember that Multiliteracy-Based Learning Environment aims to teach students to be literate in an increasingly diverse and changing world. It is an approach that supports the development of literacy skills that are relevant and necessary in today's digital and information media era.

3 METHOD

3.1 *Research Design*

This study employs a descriptive qualitative post positivism method, which enables researchers to explore thoroughly, and document observed phenomena without intervening or changing the variables under consideration. Researchers aim to grasp the subjective interpretations informants assign to attempts at enhancing creative thinking. Such insights will uncover the strategies and influences shaping this endeavor. The data is collected through verbal responses based on observed behaviors and analyzed inductively, facilitating a comprehensive understanding of the context.

1.1. *Population, Sample and Sampling Technique*

The study population consisted of all individuals involved in educational activities and the principal of schools within Malang City. The research sample included four classroom teachers, four assistant teachers, and one principal, making up nine informants. The researchers chose these informants using purposive sampling, which targets data collection to meet specific needs. This technique selects informants with detailed knowledge pertinent to the research focus and are considered reliable sources. The selected informants were credible, had over two years of teaching experience, and possessed information aligned with the research objectives (Table 1). They were willing to provide this information objectively to the researchers.

Table 1. Research Informants

No	Participant Group	Participant Code	Gender	Teaching Duration
1	Class Teacher	G1-AFI	Woman	4 Years
2		G2-IDA	Woman	6 Years
3		G3-FRA	Man	5 Years
4		G4-ALI	Man	2 Years
5	Assistant Classroom teacher	A1-NIT	Woman	6 Years
6		A2-MAY	Woman	3 Years
7		A3-NIN	Man	4 Years
8		A4-TIA	Woman	9 Years
9	Head of Kindergarten	K1-RAH	Man	8 Years

1.2. *Data Retrieval Technique*

The data collection technique in this study uses three techniques, 1) A semi-structured in-depth interview technique was used to seek information about teachers' understanding of creativity and their views on how to encourage creativity in the classroom. The second interview gathered information regarding teachers' experiences in multiliteracy-based learning strategies, changes in teaching behavior, perceived children's learning, and difficulties faced in trying new strategies. 2) Participatory observation was used to check the information provided by teachers in the interviews by observing and recording. This observation uses the reference of 5 dimensions of creative thinking and syntax of multiliteracy learning strategies. 3) Documentation study applied in this research is through books, reading sources, literature, field notes, and official documents such as lesson plans. The credibility of qualitative research results will be higher if it involves or uses this document study in its qualitative data collection.

1.3. *Data Analysis Technique*

In this study, data analysis was conducted using the Miles and Huberman interactive model. The initial phase involved collecting data through semi-structured interviews with all informants, observations of teaching activities, and gathering documentation related to these activities at the school. The next phase, data condensation, involved the researchers categorizing and summarizing data from the interviews, observations, and documents into pertinent themes or categories. During the presentation stage, the data was visually represented in tables, charts, or diagrams to depict the strategies for multiliteracy-based learning. In the final stage, the researchers concluded and confirmed the findings based on the patterns identified in the data presented.

4 RESULT AND DISCUSSION

4.1 *Result*

The results of the study were presented based on three main objectives: (1) Explore and identify teacher strategies in implementing a multiliterate approach in the preschool learning environment to increase children's creativity. (2) Evaluate the positive impact of multiliteracy use on preschool children's creative thinking skills, and (3) Identify factors that support and can hinder preschoolers' ability to think creatively in multiliteracy-based learning environments. The research findings are in figure 1. Creating a Multiliteracy-Based Learning Environment.

4.1.1 *Teacher Strategies in Facilitating the Development of Creative Thinking Skills*

During the data analysis, key findings emerged from participants' narratives and experiences. These findings are then organized into categories and given in the form of key points. The findings include learning strategies using a seamless learning approach. The findings of the study can be seen at the Figure 1.

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│                         │      ────────────→  │ Implementation of Teacher│
│                         │                     │   Learning Strategies    │
│                         │                     └─────────────────────────┘
│ Creating a Multiliteracy-│                    ┌─────────────────────────┐
│ Based Learning          │ ──────────────────→ │  Positive Impact of Using│
│ Environment             │                     │      Multiliteracy       │
│                         │                     └─────────────────────────┘
│                         │                     ┌─────────────────────────┐
│                         │      ────────────→  │  Supporting Factors and  │
│                         │                     │ Inhibiting the Ability of│
└─────────────────────────┘                     │      Preschoolers        │
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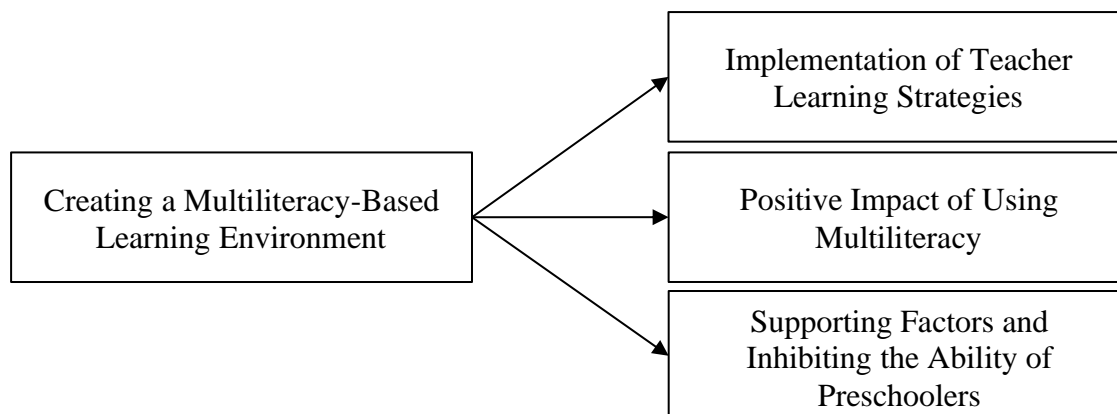
Figure 1. Schematic Creating a Multiliteracy-Based Learning Environment

The application of learning strategies in the use of multiliteracy to the creative thinking ability of preschool children that is most encountered from the interview results is 1) Fluent Thinking (Fluency): The ability to generate many ideas presented by as many as 6 informants. 2) Redefinition: The ability to review a problem through different ways and points of view presented by 5 informants, and 3) Involvement in creative activities presented by 5 informants (see Table 2).

Table 2. Application of Teacher Learning Strategy

Theme	Sub-themes	Findings	Informants
Fluent Thinking	Ability to generate multiple ideas	Given the freedom to explore multiliterate resources, such as images, videos, and the internet to express ideas	G2-IDA, G4-ALI, A1-NIT, A2-MEI, A3-NIN, K1-RAH
Flexible Thinking	Ability to propose various approaches to solve problems &; find creative solutions	Encouraged to find various solutions through various literacy sources, for example using the surrounding environment so that children can have broad references	A4-TIA, K1-RAH
Elaborative thinking (Elaboration)	Ability to describe something in detail. Ability to develop ideas in depth and detail	Collaborative projects that encourage the sharing of ideas and cooperation among friends to develop their character	G2-IDA
Original thinking (Originality)	The ability to give birth to their thinking ideas.	Given the opportunity to express themselves using collaborative projects to generate new ideas	G4-ALI, A2-MAY, A3-NIN
Redefinition	Ability to review a problem through different ways and points of view	Being given assignments that encourage critical thinking through role simulation allows students to experience problems from the perspective of others thus stimulating empathy and deep understanding,	G1-AFI, G3-FRA, A3-NIN, A4-TIA, K1-RAH
Collaborative Online	Ability to collaborate effectively through online platforms and digital technology	Utilizing digital tools to collaborate effectively allows students to contribute from a variety of locations	G2-IDA, G4-ALI

Theme	Sub-themes	Findings	Informants
Involvement in creative activity	Creative activity is intensified, and most children become more engaged and proactive.	Teachers and students actively engage in creative activities with digital media allowing students to express ideas more interestingly and innovatively	G1-AFI, G3-FRA, A2-MEI, A4-TIA, K1-RAH

In the most discussed learning strategy is the aspect of Fluent Thinking (Fluency) this is because in a collaborative learning environment, the ability to generate many ideas allows students to actively participate in joint projects and enrich discussions with students' creative contributions. In addition, Fluent Thinking helps students to embrace the creative process and find innovative solutions to problems, while the ability to generate multiple ideas provides students with several options and alternatives that can be considered for completing a task or project, supporting the development of problem-solving skills. Another aspect that is most discussed is the Redefinition aspect because this aspect can encourage students to look at problems from various perspectives, broadening the scope of their literacy. As well as being able to review problems in building critical thinking skills, inviting students to ask questions and analyze information carefully. It also helps students understand a problem more deeply, utilizing various literacy and media to gain a holistic understanding.

The most discussed aspect is the Engagement aspect in creative activities, as Creative activities can be the focus as they encourage more proactive student engagement. Creative activity has a strong appeal, motivating students by giving them opportunities to express themselves and challenge their creativity. This creativity not only increases students' interest, but also makes them more engaged and active in the learning process. In addition, creative activity spurs the development of critical thinking skills, as students are engaged in planning, organizing, and evaluating their own ideas. By thinking beyond conventional boundaries, students also develop problem-solving skills that are important in multiliterate contexts and can support the integration of multimodal literacy by utilizing various media, such as text, images, sound, and video, in accordance with the demands of multiliteracy that includes various types of literacy. Through collaboration in creative projects, students improve their social and collaborative skills.

4.1.2 *Analyze the Supporting and Inhibiting Factors of Preschoolers' Creative Thinking Ability in The Context of a Multiliterate Environment*

During the data analysis, key findings emerged from participants' narratives and experiences. These findings are then organized into categories and given in the form of key points. These findings include supporting and inhibiting factors for the creative thinking ability of preschool children in the context of a multiliterate environment using a seamless learning approach (see Table 3).

Table 3. Supporting and Inhibiting Factors of Creative Thinking Ability

Theme	Sub-themes	Research Findings	Informants
Supporting Factors	Teachers already understand and are competent in teaching	Teachers provide creative challenges, such as open-ended questions and art	G1-AFI, G3-FRA, A3-NIN,

Theme	Sub-themes	Research Findings	Informants
	using a multiliterate approach	projects, to stimulate the creative thinking of preschoolers.	A4-TIA, K1-RAH
	Unified collaboration between teachers and assistants	Assistant teachers and teachers can collaborate to provide additional support, broadening children's horizons through structured creative thinking activities.	K1-RAH, G1-AFI, G3-FRA, A3-NIN, A4-TIA
	Support of Institutions and principals to promote multiliteracy	Principals promote a school culture that supports creativity, providing incentives for innovation and collaboration among teachers.	A1-NIT
Inhibiting Factors	Budget and facility limitations	Teachers experience obstacles in providing adequate multiliteracy resources due to budget and facility constraints.	G2-IDA, A2-MEI, A3-NIN, A4-TIA, K1-RAH
	Limited time and teaching staff	Teacher assistants are limited in providing full support to children due to time constraints and the number of teacher assistants.	A4-TIA, G3-FRA, G4-ALI, K1-RAH
	Infrastructure limitations	The headmaster identified challenges in acquiring and maintaining multiliterate resources due to budget and infrastructure factors.	G1-AFI, G3-FRA

The factors supporting the creative thinking ability of preschool children that are most encountered from the interview results are 1) Teachers are competent in teaching using a multiliterate approach presented by 5 informants, and 2) Collaboration between teachers and cohesive assistants presented by 5 informants. As for the inhibiting factors inhibiting the creative thinking ability of preschool children, the most encountered from the interview results were 1) Limited budget and facilities presented as many as 5 informants and 2) Limited time and teaching staff presented as many as 4 informants.

In the most discussed supporting factors are competent teachers in teaching using a multiliterate approach and collaboration between teachers and assistants who are cohesive, this is because teachers who are competent in teaching with a multiliterate approach have mastery of methods and skills to integrate various forms of literacy in their teaching. They can adapt their approach to suit students' needs and learning styles, ensuring an inclusive and effective learning experience. In addition, effective teachers in multiliteracy can develop students' critical and creative thinking skills through this approach. On the other hand, cohesive collaboration between teachers and assistants provides additional support in the implementation of a multiliterate approach. Assistants can assist in the preparation of materials, provide individual support to students, and maintain smooth classroom activities. Effective task sharing allows teachers to focus on more in-depth teaching planning, while assistants provide direct support to students. Collaboration also enables optimal utilization of resources, with teachers and assistants working together to create a productive and inclusive learning environment.

While the most discussed inhibiting factors are limited budget and facilities and limited time and teaching staff, this is because budget constraints often limit students' access to technology and learning materials that are essential to apply a multiliterate approach. The provision of diverse learning resources and in accordance with the principles of multiliteracy can also be hampered by financial limitations. In addition, limited time, and high teacher workload present challenges in integrating multiliteracy practices into the curriculum. Teachers may have difficulty in providing individual guidance to students, and limited time may hinder the full implementation of the potential of multiliteracy teaching.

4.1.3 *Evaluate the Positive Impact of Multiliteracy Use on Preschoolers' Creative Thinking Skills*

During the data analysis, key findings emerged from participants' narratives and experiences. These findings are then organized into categories and given in the form of key points. These findings include the positive impact of learning the use of multiliteracy on the creative thinking ability of preschool children using a seamless learning approach (Table 4).

Table 4. The Positive Impact of Multiliteracy Use on The Creative Thinking Ability of Preschoolers

Theme	Sub-themes	Findings	Informants
Integration of multiliterate approach with Curriculum	Understanding the concept of multiliteracy	Understanding of the concept of multiliteracy remains good among teachers and teacher assistants. Children showed increased understanding of the concept of multiliteracy.	G2-IDA, G4-ALI, A1-NIT, A2-MEI, A4-TIA
	Integration of multiliteracy in the curriculum	After implementation, multiliteracy integration increased, but it still needs improvement to cover more aspects of the curriculum.	G1-AFI, G3-FRA, G4-ALI, A1-MAY,
	Use of technology in learning	The use of technology increases after additional training and resources are provided.	K1-RAH, A1-NIT
Inhibiting Factors	Principal support	Once the benefits are understood, the headmaster provides more active support and allocates additional resources.	G2-IDA, G3-FRA
	Integration in school policies	Once the benefits are understood, the headmaster provides support to the development of communicating effectively using a variety of media.	K1-RAH, G1-AFI, A1-NIT
	Evaluation of learning outcomes	After the introduction of multiliteracy, the children's creativity learning outcomes are evaluated in more detail and given feedback.	G2-IDA, G4-ALI, A2-MEI, A4-TIA, A1-NIT, K1-RAH
Implementation of Multiliteracy Learning in the Classroom	Multimodal Interactive Stories	Reading storybooks with the use of media such as images, sounds, and movements can stimulate students' imagination and creativity	A1-NIT, A3-NIN, G1-AFI, G3-FRA, K1-RAH
	Collaboration Project with Different Media	Hold collaborative projects with different media, such as creating stories with pictures, sound recordings, or hand puppets.	G1-AFI

Theme	Sub-themes	Findings	Informants
	Interactive Digital Media	Utilizing interactive apps allows students to play while they learn, encouraging creativity and problem-solving.	K1-RAH, A1-NIT, A2-MEI, A4-TIA, G4-ALI, G1-AFI
	Drama and Theatre	Can participate in roles, compose stories, and use costumes and props to express their creative ideas.	G2-IDA, G3-FRA, A2-MAY, ,
	Poetry and Creative Songs	Teach expressing feelings and ideas through writing poems or songs with words they create themselves.	G1-AFI, G4-ALI, A2-MAY, A4-TIA
	Creating Your Own Children's Books	Provide opportunities to create books using images, writing, and creativity.	A3-NIN
	Visual Arts Stimulation	Hold visual arts activities such as painting, making crafts, or creating 3D artwork to stimulate imagination and visual creativity.	G1-AFI, G4-ALI
	Environmental Exploration	Invite them to explore their surroundings, take pictures or sketch what they see, and share creative ideas.	G2-IDA, A1-NIT, A3-NIN
	Puzzles and Problem-Solving Games	Use this medium to stimulate creative thinking skills in solving problems.	G1-AFI, G2-IDA, A1-NIT, A3-NIN, G4-ALI, A2-MEI, K1-RAH
	Role Simulation	Organizing activities that can pretend to be a variety of characters or occupations, stimulate the imagination and involve a variety of literacy.	K1-RAH, A3-NIN

The positive impact of the use of multiliteracy on the creative thinking ability of preschool children that was most encountered from the interview results was 1) Integration of the Multiliteracy Approach with the Curriculum: Understanding the concept of multiliteracy presented by 5 informants. 2) School support for multiliteracy-based learning: Evaluation of learning outcomes presented by 6 informants. 3) Implementation of Multiliteracy Learning in the Classroom: Multimodal Interactive Stories presented by 5 informants, Interactive Digital Media presented by 6 informants and Puzzles and Problem-Solving Games presented by 7 informants.

The most widely discussed positive impact in the integration of the multiliterate approach with the curriculum is the understanding of the concept of multiliteracy, this is because this concept includes a broader perspective of literacy, considering the various dimensions of literacy that are very important in facing the dynamics of an increasingly connected and complex modern society. With a focus on written, visual, and digital literacy, understanding the concept of multiliteracy provides a foundation for the development of relevant and comprehensive skills for students. In the digital age and technological developments, curricula that incorporate the concept of multiliteracy allow students to actively participate in a world colored by media, present messages through various modes of expression, and cope with global demands. With an emphasis on creativity, innovation, collaboration, and critical literacy, the integration of multiliterate concepts aims to give students the tools needed to face the challenges and opportunities of the future.

In school support for multiliteracy-based learning, the most discussed is the evaluation of learning outcomes because it is a real picture of the extent to which students have achieved multiliteracy competence. Evaluation of learning outcomes is also a key instrument to measure student progress in the use of media and technology in the context of multiliterate learning. Data from these evaluations provide a foundation for schools to evaluate the effectiveness of multiliteracy curricula and determine whether the teaching methods applied have successfully supported the development of students' literacy skills. In addition, evaluation of learning outcomes helps in monitoring the achievement of learning objectives related to multiliteracy approaches, supports continuous improvement, and provides insight into student involvement in the learning process.

In the implementation of multiliteracy learning in the classroom, the most discussed results are three aspects, namely multimodal interactive stories, interactive digital media, and puzzles and problem-solving games. Multimodal interactive stories stand out because they provide students with a more well-rounded learning experience, involving a variety of elements such as text, images, sound, and possibly animation. It focuses on the multimodality aspect, students become not only passive consumers of information, but also producers of creative content, building their understanding through active participation. In addition, interactive digital media also plays an important role in creating an interesting and relevant learning environment for the generation that grew up in the technological era. The integration of digital media, such as videos, simulations, and multimedia presentations, not only enriches the learning process but also supports the development of students' digital literacy, and can provide opportunities for exploration, collaboration, and independent learning, creating diverse learning experiences. The use of puzzles and problem-solving games in multiliteracy learning provides a fun approach to developing students' critical and problem-solving skills. Games like puzzles allow students to hone their literacy skills while staying engaged in the challenging learning process. This aspect can create creativity and collaboration among students, create a dynamic learning environment and support the balanced development of various literacy skills.

4.2 *Discussion*

4.2.1 *Teacher Strategies in Facilitating the Development of Creative Thinking Skills*

Improving teacher learning strategies in creating a multiliteracy-based learning environment can be done through several strategic steps, namely through training and professional development for teachers. Research by Ni'mah and Sukartono (2022) showed that a teacher can improve students' thinking creativity by implementing several things, such as: building a conducive and safe classroom atmosphere, providing opportunities for students to explore and find ideas, and using varied and interesting teaching methods. Teachers need to gain an in-depth understanding of the concept of multiliteracy and skills to integrate verbal, visual, digital, and other media literacy in learning (Rahman et al., 2022). Daulay et al. (2022), suggest this training can include

workshops, seminars, and continuous learning resources so that teachers can develop their skills in supporting multiliteracy literacy, so it is important to design an integrated learning plan that emphasizes the integration of literacy across multiple subjects. This can be achieved by designing multiliteracy-based projects that challenge students to use their full range of literacy skills. Sitepu et al. (2022), suggest that the importance of integrating technology and media as a means to increase digital and multimodal literacy in a multiliterate approach.

Through the exchange of experiences and ideas among peers, teachers can provide mutual support and build collective knowledge in implementing multiliteracy strategies (Díaz-Díaz et al, 2022). Forming a teaching team or learning community in schools can also be a place to design and evaluate learning practices. In this context, teachers can share responses and learn together, creating a culture of cooperation that enriches multiliteracy literacy (Galaktionova & Kazakova, 2022). The use of technology and media is crucial in the development of a multiliteracy-based learning environment. Teachers need to actively combine technological tools, applications, and digital resources to enrich students' literacy experience. Using digital literacy and multimodal as an integral part of a multiliteracy approach can improve students' skills in consuming and producing information through various media (Yafie et al., 2020). By implementing these steps, teachers can create a dynamic, creative learning environment that supports students' literacy development in a variety of multiliteracy contexts.

4.2.2 *Supporting and Inhibiting Factors for The Creative Thinking Ability of Preschoolers in The Context of a Multiliterate Environment*

The main supporting factor in the creative thinking ability of preschoolers in the context of a multiliterate environment is the provision of a learning environment rich in literacy in various forms. Preschoolers can be given the opportunity to develop creative thinking through interaction with various types of literacy materials, such as storybooks, pictures, music, and digital media (Palsa & Mertala, 2019). Environments that blend verbal, visual, and digital literacy provide diverse creative stimuli, encouraging children to explore new ideas and develop creative thinking skills (Miller et al., 2022). The role of teachers and parents as facilitators of creativity is very important in optimizing the creative thinking ability of preschool children. The study conducted by Behnamnia et al. (2020) said that teachers can play an active role in designing learning activities that stimulate children's creativity, provide positive feedback, and support innovative ideas. By giving children the freedom to explore, encourage creative questions, and provide challenges that are appropriate to their level of development can improve creative thinking skills (Pristiwo & Muflihah, 2023). Likewise, parental support in creating creative environments at home, such as reading together, providing time for creative play, and promoting literacy in various contexts, can have a positive impact on the development of creativity of preschoolers.

Another contributing factor lies in teachers showing a positive attitude towards creative exploration and expression, as well as providing examples of creative behavior, can

inspire children to develop innovative mindsets (Bohn & de Freitas, 2020). Role models from parents also have a significant impact. When parents are actively involved in literacy and creative activities with children, they provide direct support and reinforce the importance of literacy in everyday life. In addition, the emphasis on process rather than results can be an important contributing factor. Pye & Chan (2023) argued to emphasise the importance of giving pre-school children the opportunity to explore and experiment without overemphasising the result. This approach helps create a pressure-free environment, where children feel comfortable to think creatively and explore their ideas without fear of making mistakes (Ulger, 2018). By optimizing these supporting factors, the multiliteracy environment can be a fertile place for the development of creative thinking skills of preschoolers.

Inhibiting factors can form a serious challenge in efforts to improve the creative thinking skills of preschoolers in a multiliterate environment. One of them is limited resources, both in the form of literacy and accessibility to creative tools and media. (Kustiawan & Yafie, 2021; Yafie et al., 2021) highlight that the insufficiency of literacy resources, such as storybooks and creative equipment, can be detrimental to the development of creativity of preschool children. These limitations can limit the variety of stimuli children can receive, hindering their ability to explore ideas and concepts widely (Malmia et al., 2019). In addition, lack of support and understanding from teachers and parents is also a significant inhibiting factor. Teachers and parents who do not support or do not understand the importance of giving freedom to children to explore and express their ideas creatively can hinder the development of creative thinking skills in preschoolers (Brezovszky et al, 2019). If teachers and parents do not provide adequate support, children may feel undervalued in their creative endeavors, hindering their motivation and confidence in exploring new ideas.

Based on the findings above, the research on teachers' multiliteracy learning strategies has some limitations such as the generalizability is very limited because it was conducted in one school. The evaluation of effectiveness to measure students' progress in multiliteracy also has limitations. So in future research, it is expected to involve a wider and more diverse sample to expand the generalizability of the findings, and in conducting a comprehensive evaluation of the effectiveness of multiliteracy learning strategies, it is expected to use valid and reliable methods and involve all relevant stakeholders.

4.2.3 *The Positive Impact of The Use of Multiliteracy on The Creative Thinking Ability of Preschoolers*

The use of multiliteracy in the educational context of preschoolers has a significant positive impact on students' creative thinking abilities. Multiliteracy enriches children's literacy experiences by providing different types of texts and media, including verbal, visual, and digital texts. Children's exposure to diverse literacy can stimulate their imagination and creativity (Hapidin et al, 2023). Findings by Elleman and Oslund (2019) found that children were able to develop a deeper understanding of different forms of representation and expressing their ideas through different modes of literacy. In addition,

the use of multiliteracy also opens opportunities for project-based learning experiences, where children can engage in challenging creative activities. These projects encourage children to think critically, identify problems, and find solutions using a variety of literacy skills (Kulju et al., 2018). Thus, multiliteracy provides a framework that supports the development of preschoolers' creative thinking skills through exploration- and creation-centered learning (Saregar et al., 2021).

Using multiliteracy in learning can strengthen preschoolers' critical thinking skills by stimulating their ability to think holistically and creatively. The multiliterate approach allows children to develop broader and deeper literacy (Murray et al, 2018). By utilizing this various literacy, children can hone their critical skills in understanding and interpreting information from various sources (Yafie et al., 2021). They can also learn to connect their ideas in more creative ways. Another positive impact shows that multiliteracy can stimulate curiosity and motivation to learn preschoolers (Huang et al., 2019). Through fun and engaging literacy experiences, children can develop an interest in learning and increase their confidence to convey their ideas in diverse ways (Wu et al., 2019). The use of digital literacy and media in multiliterate contexts can make learning more relevant and challenging for children, motivating them to continue to think creatively and exploratorily.

Based on the findings above, the research on teachers' strategies to create a multiliteracy-based learning environment has several limitations, such as limited generalizability because it was conducted in one school, so further research is expected to involve a wider and more diverse sample to expand the generalizability of the findings. Evaluation of effectiveness also needs to be more in-depth by using more valid and reliable methods and involving all stakeholders. In addition, the involvement of all stakeholders, such as teachers, parents, schools, and communities, is also important to get a broader perspective. Also, aspects of the practical context, such as the availability of resources and support from related parties, need to be considered in future research. By addressing these limitations and taking appropriate recommendation steps, future research is expected to make a greater contribution to the understanding of multiliteracy learning strategies and their impact on preschoolers' creative thinking skills.

5 CONCLUSION

Improving creative thinking in preschoolers through a multiliteracy-based approach involves the strategic role of teachers, collaboration between teachers, and efforts to mitigate inhibiting factors. Teacher strategies that are directed at the integration of diverse literacy and the use of technology are the main foundations in creating a learning environment that stimulates creativity. Contributing factors, including resource support and parental understanding, are key to providing diverse literacy experiences. On the other hand, inhibiting factors such as budget constraints and lack of understanding of the concept of multiliteracy need to be addressed for this approach to be implemented effectively. The positive impact in the implementation of multiliteracy learning in the classroom using 10 media such as Multimodal Interactive Stories, Collaboration Project with

Different Media, Interactive Digital Media, Drama and Theater Performance, Creative Poetry and Song, Making Your Own Children's Book, Visual Arts Stimulation, Environmental Exploration, Puzzle and Game Problem Solving and Role Simulation can be used for the development of creative thinking skills of preschoolers, increased motivation to learn, and empowerment of literacy throughout their lives. Thus, the multiliteracy approach not only creates a strong foundation for children's personal development but also stimulates literacy growth in a dynamic and diverse learning environment.

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