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BRAINSTORMING DAN PEER LESSON UNTUK MENINGKATKAN KREATIVITAS : A SCOPING REVIEW

Luki Perasetyo Adi Saputro
lukisaputro150501@gmail.com
Universitas 17 Agustus 1945

ABSTRAK

Kreativitas merupakan kompetensi penting dalam pendidikan abad ke-21, namun praktik pembelajaran di lingkungan pendidikan formal masih didominasi oleh pendekatan berpusat pada guru sehingga kurang memberikan ruang bagi eksplorasi ide, kolaborasi, dan refleksi peserta didik. Metode brainstorming banyak digunakan untuk mendorong berpikir divergen, sementara Peer Lesson menekankan interaksi antarpeserta didik dan proses reflektif. Meskipun demikian, kajian yang mengintegrasikan kedua strategi tersebut masih terbatas. Penelitian ini bertujuan untuk memetakan dan mensintesis literatur terkait penerapan brainstorming dan Peer Lesson dalam meningkatkan kreativitas pada berbagai jenjang pendidikan. Penelitian ini menggunakan metode scoping review dengan mengacu pada pedoman PRISMA-ScR. Pencarian literatur dilakukan pada basis data Scopus, Web of Science, ERIC, Google Scholar, dan DOAJ untuk publikasi tahun 2020–2025. Setelah proses seleksi dan penilaian kelayakan, diperoleh 11 artikel yang dianalisis menggunakan pendekatan deskriptif dan tematik. Hasil kajian menunjukkan bahwa brainstorming secara konsisten meningkatkan aspek utama kreativitas, terutama fleksibilitas, orisinalitas, dan kelancaran berpikir. Namun, ketika diterapkan secara terpisah, metode ini kurang optimal dalam mengembangkan kolaborasi dan refleksi. Studi yang mengintegrasikan Peer Lesson menunjukkan hasil yang lebih kuat pada dimensi interaksi sosial dan refleksi. Oleh karena itu, integrasi brainstorming dan Peer Lesson diperlukan untuk pengembangan kreativitas yang lebih komprehensif.
Kata Kunci: Brainstorming, Peer Lesson, Kreativitas, Pembelajaran Kolaboratif, Scoping Review.

ABSTRACT

Creativity has become a fundamental requirement in contemporary education; however, classroom practices in formal learning settings frequently continue to rely on teacher-dominated approaches that limit opportunities for creative engagement and collaboration. Brainstorming is commonly applied to encourage divergent thinking, whereas Peer Lesson emphasizes peer-based interaction and reflective learning processes. Despite their potential, research examining the combined implementation of these strategies remains limited. This study aims to map and synthesize scholarly evidence on the application of brainstorming and Peer Lesson in fostering creativity across educational levels. This study employed a scoping review guided by the PRISMA-ScR framework. Relevant literature published between 2020 and 2025 was retrieved from Scopus, Web of Science, ERIC, Google Scholar, and DOAJ. Following systematic screening and eligibility assessment, eleven studies were included for analysis using descriptive and thematic synthesis. The results show that brainstorming consistently supports key aspects of creativity, particularly flexibility, originality, and fluency. However, when implemented independently, it tends to insufficiently address collaborative and reflective dimensions. Studies incorporating Peer Lesson or collaborative learning structures demonstrate stronger outcomes in peer interaction and reflective engagement. Technology-supported brainstorming offers additional potential, although its effectiveness depends on appropriate instructional design. Overall, the findings suggest that integrating brainstorming with Peer Lesson is essential for achieving a more comprehensive development of creativity.
Keywords*: Brainstorming, Peer Lesson, Creativity, Collaborative Learning, Scoping Review.*

INTRODUCTION

In the era of globalization, creativity has become a critical competency for individuals across educational and professional contexts. In education, teachers' creativity plays a central role in fostering students' learning motivation, creating innovative learning environments, and enhancing educational quality (Kurniasih, 2024). In the workplace, creative and innovative thinking is increasingly required to address complex and dynamic challenges. The capacity to generate novel ideas and effective solutions constitutes a key competitive advantage amid rapid technological advancement and global competition (Alda Deria et al., 2023). Therefore, fostering creativity in both educational and professional settings represents a strategic investment in developing adaptive and future-ready individuals.

One instructional approach widely recognized for enhancing creativity is brainstorming. This method promotes the open generation of ideas in group settings without premature evaluation, encouraging adolescents to think freely and divergently (Desmet & Sternberg, 2024). Brainstorming stimulates curiosity, confidence in expressing opinions, and cognitive flexibility, enabling learners to explore multiple solutions without fear of making mistakes.

Peer Lesson strategies further strengthen creative development by allowing adolescents to exchange ideas, engage in discussion, and provide immediate feedback in supportive and egalitarian learning environments. Such interactions enhance engagement, support cognitive–emotional processes, and deepen understanding through peer dialogue (Chen, 2024).

The integration of brainstorming within Peer Lesson activities creates a more interactive and collaborative learning process. Through peer discussion and shared reflection, ideas can be refined and expanded, aligning with constructivist perspectives that emphasize social interaction and active learning in knowledge construction and creativity development (Siahaan et al., 2024). Empirical evidence indicates that cooperative learning approaches incorporating brainstorming contribute to greater cognitive flexibility and imaginative thinking among adolescents aged 10–14 years (Segundo-Marcos et al., 2023).

Additional studies highlight that active participation and open discussion in group-based learning significantly enhance original and solution-oriented thinking. Supportive learning communities play a crucial role in cultivating adolescents' creative potential (Saeed & Ramdane, 2022). Furthermore, the use of digital technology expands the effectiveness of brainstorming within Peer Lesson frameworks by providing low-pressure environments for idea expression, which is particularly important for adolescents sensitive to social evaluation (Li et al., 2022).

Despite extensive research on brainstorming and peer-based learning independently, comprehensive reviews examining their combined impact on creativity remain limited. Consequently, a scoping review is necessary to map existing literature, assess the consistency of findings, and identify research gaps (Tang et al., 2022). Scoping reviews also enable the examination of methodological diversity, educational contexts, participant characteristics, and instructional designs, offering an initial synthesis of how integrated brainstorming and Peer Lesson strategies influence adolescent creativity across educational systems (Gummerum, 2020).

Accordingly, this study aims to map and synthesize existing literature on the use of brainstorming and Peer Lesson strategies in enhancing creativity, with the expectation of contributing to the development of innovative and effective learning approaches for adolescents.

METHODOLOGY

This study employs a scoping review design to map and analyze relevant literature concerning the use of brainstorming integrated with Peer Lesson strategies to enhance creativity. A scoping review is appropriate for this study because it enables a comprehensive

examination of a broad body of literature, facilitates the identification of research patterns, and helps reveal existing research gaps.

Accordingly, the review process follows the five-stage framework proposed by Tricco et al. (2018), which consists of: (1) identifying the research problem and formulating research questions; (2) identifying relevant articles; (3) selecting studies through a screening process; (4) charting and mapping the data; and (5) collating, summarizing, and reporting the findings.

1. Identifying the Research Problem and Research Questions

The initial stage of a scoping review involves clearly defining the focus of the study and formulating well-structured research questions. A scoping review should concentrate on a specific topical area and be guided by clearly articulated research questions to ensure systematic and relevant analysis (Peterson et al., 2017). To support the formulation of research questions, this study adopts the PEOs framework (Population, Exposure, Outcomes, Study Design). This framework helps clarify the scope of the review and ensures alignment between the research objectives and the literature being examined.

Tabel 1. Framework POEs for Scoping Review Questions

P (Population)	***E (Exposure)***	***O (outcomes)***	***S (Study Design)***
Students and educators across various levels of formal education	Active learning methods, specifically brainstorming and Peer Lesson	Forms of implementation, impacts on creativity development, and supporting and inhibiting factors	Various empirical studies and scholarly articles related to the use of brainstorming and Peer Lesson in educational contexts

Based on the PEOs framework above, the research questions guiding this scoping review are formulated as follows:

a. What forms of implementation of brainstorming and Peer Lesson strategies are reported in educational contexts?
b. How do brainstorming and Peer Lesson strategies influence creativity development?
c. What factors support or hinder the implementation of these two instructional methods?

2. Identifying Relevant Studies

The second stage of the scoping review focuses on identifying studies that are relevant to the research questions. A systematic search strategy was employed to ensure comprehensive coverage of the literature related to brainstorming and Peer Lesson strategies in creativity development. This stage is essential for capturing a broad range of evidence and minimizing the risk of missing pertinent studies (Tricco et al., 2018). To achieve this, key concepts derived from the research questions were translated into searchable terms. Inclusion and exclusion criteria were established prior to the search process to guide the identification of eligible studies.

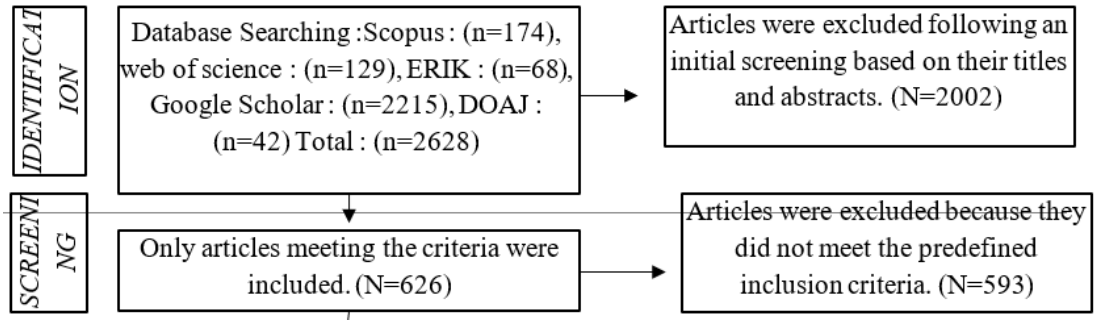
Table 2. Inclusion and Exclusion Criteria

Criteria	**Description**
Inclusion	**(1) Articles published in English or Indonesian;** **(2) Articles published between 2020 and 2025;** **(3) Studies addressing creativity and the use of brainstorming and/or Peer Lesson strategies in educational contexts**
Exclusion	**(1) Studies not focusing on creativity;** **(2) Studies that do not examine brainstorming or Peer Lesson strategies;** **(3) Non-empirical articles lacking sufficient methodological information**

Literatur Search Strategy

To identify relevant articles for this scoping review, a systematic literature search was conducted using multiple electronic databases. The databases consulted included Scopus, Web of Science, ERIC, Google Scholar, and DOAJ, selected to ensure broad coverage of international and open-access scholarly publications.

The literature search was guided by predefined keywords related to the focus of the review, namely brainstorming, Peer Lesson, creativity, and collaborative learning. These keywords were combined using Boolean operators (AND, OR, NOT) to refine and optimize the search results. The use of Boolean operators was adjusted according to the structure and indexing rules of each database. The search process was carried out systematically by applying the established keyword combinations while consistently adhering to the predefined inclusion and exclusion criteria. This approach ensured that the retrieved studies were relevant to the research questions and aligned with the scope of the scoping review.



The PRISMA model consists of four main stages: identification, screening, eligibility, and inclusion, as illustrated in the PRISMA-ScR flow diagram (Tricco et al., 2018). Retrieved records were assessed in accordance with the research objectives and guiding questions. Articles were included if they met the predefined inclusion and exclusion criteria. Following the screening process, 11 articles were retained for final inclusion. Data charting was subsequently conducted to extract key information from the included studies, as presented in Table 3.

Table 3. Data Extraction Table (Revised)

ID	Author(s) (Year)	Study Design / Method	Context / Participants	Key Findings (Main Points)
A1	Li, Kim, & Palkar (2022)	Systematic review (32 experimental studies; quantitative comparisons such as ANOVA / repeated-measures reported across studies)	Formal education settings (from preschool to higher education)	merging technologies generally support student creativity, especially in interactive environments; however, effectiveness depends on instructional design quality, implementation clarity, and valid creativity measurement.
A2	Praminingsih, M., et al. (2023)	Quasi-experimental (nonequivalent pretest–posttest control group; MANOVA)	School students; evaluating PBL integrated with brainstorming	PBL + brainstorming significantly improves critical and creative thinking; students become more active in idea generation, problem analysis, and solution evaluation.

ID	Author(s) (Year)	Study Design / Method	Context / Participants	Key Findings (Main Points)
A3	Saeed & Ramdane (2022)	Quasi-experimental design (pretest–posttest control group; creativity assessment scales)	Secondary education classrooms	Brainstorming-based group learning significantly improves creative thinking, particularly fluency and originality. Collaborative discussion and delayed evaluation foster higher student engagement and idea generation
A4	Boutayeb, A. (2024)	Qualitative descriptive / observational (observation grid)	Grade 5 primary students (small sample; Algeria)	Brainstorming supports creative-thinking development by promoting free expression, interaction, and collaborative idea generation; observed outcomes suggest improved engagement and originality in classroom tasks.
A5	Al Masri & Smadi (2023)	Quasi-experimental (achievement test +creative/innovative thinking test; ANCOVA reported)	7th-grade English classes (Jordan); experimental vs control groups	Brainstorming instruction led to higher innovative-thinking outcomes and better academic achievement than traditional methods.
A6	Segundo-Marcos, J., López-Belmonte, J., Moreno-Guerrero, A.-J., & Pozo-Sánchez, S. (2023)	Quasi-experimental (pretest–posttest control group; creativity assessment instruments)	Primary and secondary education students (ages 10–14)	Collaborative learning activities incorporating structured brainstorming significantly enhance students' creativity, particularly idea fluency and imaginative thinking. Peer interaction and open discussion spaces function as key mechanisms for creative development.
A7	Doğan, S., & Batdı, V. (2021)	Meta-thematic analysis (qualitative synthesis; MAXQDA)	Studies on brainstorming in educational settings	Brainstorming tends to strengthen cognitive outcomes (achievement/critical–creative thinking) and affective outcomes (participation/motivation). Implementation barriers relate to teacher readiness, time management, and classroom climate.

ID	Author(s) (Year)	Study Design / Method	Context / Participants	Key Findings (Main Points)
A8	Nilada, (2024)	Pre-experimental (one-group pretest–posttest; t-test; mean/SD)	Grade 9 students; Project-Based Learning (PjBL)	PjBL improved scientific creativity, supporting imagination, process creativity, and product-based performance; students reported positive learning satisfaction.
A9	Zhan, He, & Zhong (2024)	Systematic review & meta-analysis (effect sizes; moderator analyses)	Empirical studies on problem-solving pedagogy across grade levels	roblem-solving pedagogy shows an overall positive effect on creativity (fluency/flexibility/originality), with stronger effects under certain conditions (e.g., student-discovered problems, heterogeneous grouping, elementary level).
A10	Jayapalan, K., et al. (2024)	Qualitative descriptive (collaborative/phenomenological framing; content analysis + observation checklist)	TESL undergraduates; literature course (Malaysia)	Collaborative adaptation/performance tasks (including group idea work) support creative expression and deeper understanding of literary elements through applied production.
A11	Gong, Y., et al., (2022)	Systematic review (virtual brainstorming; creativity affordances framework)	Studies on VR/virtual brainstorming & creativity	VR-supported brainstorming can enhance idea generation and creative performance, but may introduce constraints (e.g., discomfort, device limitations); highlights research gaps (e.g., avatar design, immersion effects).

RESULTS AND DISCUSSION

This scoping review compiles evidence from eleven studies investigating the effectiveness of brainstorming and collaborative learning approaches in supporting creativity across diverse educational settings. Overall, the reviewed literature indicates that brainstorming is a prominent instructional approach for enhancing creativity, particularly when applied within interactive, student-centered, and collaborative learning environments.

Results

The findings consistently show that brainstorming-oriented instruction contributes positively to students' creative thinking abilities, especially in terms of idea fluency, flexibility, and originality. Evidence from quasi-experimental and qualitative studies suggests that structured brainstorming activities foster a classroom atmosphere where learners feel encouraged to express ideas openly, experience reduced fear of evaluation, and participate more actively in learning tasks. These conditions support the generation of diverse ideas and facilitate more effective exploration of alternative solutions (Saeed & Ramdane, 2022; Al Masri & Smadi, 2023; Boutayeb, 2024).

The reviewed studies further indicate that brainstorming produces stronger outcomes when it is embedded within comprehensive instructional models, such as Problem-Based Learning (PBL) and Project-Based Learning (PjBL). The incorporation of brainstorming into PBL enhances students' creative and critical thinking by engaging them in systematic problem analysis and collaborative idea development (Praminingsih et al., 2023). Similarly, PjBL frameworks that integrate brainstorming stages contribute to improvements in scientific creativity, imaginative engagement, and learner satisfaction by emphasizing authentic tasks and shared problem-solving experiences (Nilada, 2024).

Collaborative learning contexts emerge as another important factor in creativity development. Research on cooperative learning demonstrates that peer interaction and structured discussion opportunities strengthen the impact of brainstorming, particularly in primary and secondary education settings (Segundo-Marcos et al., 2023). In higher education, collaborative performance-based activities and group adaptations also promote creative expression and deeper understanding by encouraging dialogic interaction and collective meaning construction (Jayapalan et al., 2024). In addition to instructional design, contextual and technological factors influence creativity outcomes. Systematic reviews reveal that emerging technologies, including virtual reality–supported brainstorming, can broaden opportunities for idea exploration and creative performance. However, their effectiveness depends on the quality of instructional design, clarity of implementation, and learners' readiness to engage with digital environments (Li et al., 2022; Gong et al., 2022).

Discussion

The synthesized evidence confirms that brainstorming remains a key mechanism for creativity development, particularly when situated within collaborative and student-centered learning contexts. From constructivist and socio-cognitive perspectives, brainstorming facilitates divergent thinking by allowing learners to generate and elaborate ideas without immediate evaluative pressure, thereby strengthening core creative capacities.

At the same time, the findings indicate that brainstorming alone is insufficient to fully optimize creativity outcomes. Its effectiveness increases when combined with instructional approaches that emphasize problem solving, collaboration, and reflection. The positive results observed in PBL and PjBL settings suggest that creativity is more likely to emerge when learners engage in meaningful, authentic tasks that require sustained inquiry and peer interaction. Cooperative learning structures provide social and cognitive support that helps learners refine ideas and develop deeper creative insights.

Nevertheless, several implementation challenges remain. Meta-level analyses highlight constraints related to teacher preparedness, time management, and classroom climate, which may limit the successful application of brainstorming-based strategies (Doğan & Batdı, 2021). Additionally, while technology-enhanced brainstorming shows promise, technical limitations and usability issues may reduce its impact if not carefully addressed (Li et al., 2022; Gong et al., 2022).

Overall, this review suggests that creativity development is most effective when brainstorming is strategically integrated into collaborative learning frameworks and supported by conducive contextual conditions. When aligned with peer interaction, sound instructional design, and an environment that encourages open expression, brainstorming serves as a foundational approach for fostering creativity across educational contexts.

Thematic Findings

Brainstorming as a Catalyst for Divergent Thinking

Across the reviewed studies, brainstorming consistently emerges as a central instructional strategy for stimulating divergent thinking, particularly in the dimensions of fluency, flexibility, and originality. Empirical studies demonstrate that structured brainstorming sessions create a non-evaluative learning environment that encourages

learners to generate a wide range of ideas without fear of criticism, thereby enhancing creative output (Saeed & Ramdane, 2022; Al Masri & Smadi, 2023; Boutayeb, 2024). This theme is further reinforced by evidence showing that brainstorming promotes active participation and confidence in idea expression, which are critical prerequisites for creative performance. Similar patterns are observed across primary, secondary, and higher education contexts, indicating the robustness of brainstorming as a creativity-enhancing strategy.

Integration of Brainstorming within Learner-Centered Instructional Models

A second prominent theme highlights that brainstorming is most effective when embedded within broader learner-centered instructional frameworks, such as Problem-Based Learning (PBL) and Project-Based Learning (PjBL). Studies show that integrating brainstorming into PBL facilitates systematic problem analysis, collaborative ideation, and reflective thinking, leading to significant improvements in both creative and critical thinking skills (Praminingsih et al., 2023). Similarly, PjBL approaches that incorporate brainstorming phases support scientific creativity, imaginative engagement, and learner satisfaction by emphasizing authentic tasks and collective problem-solving experiences (Nilada, 2024). These findings suggest that brainstorming functions optimally as a core ideation mechanism within inquiry-driven pedagogies rather than as an isolated technique.

The Role of Peer Interaction and Collaborative Learning

The reviewed literature also underscores the importance of peer interaction and collaborative learning structures in amplifying creativity outcomes. Cooperative learning environments that include structured brainstorming activities enable learners to refine ideas through discussion, negotiation, and shared meaning-making (Segundo-Marcos et al., 2023). In higher education settings, collaborative performance-based and dialogic learning tasks further enhance creative expression and deepen conceptual understanding by fostering reflective peer engagement (Jayapalan et al., 2024). This theme indicates that creativity development is not solely an individual cognitive process but is strongly influenced by social interaction and collaborative knowledge construction.

Contextual and Technological Conditions Supporting Creativity

Another recurring theme concerns the influence of contextual and technological factors on the effectiveness of brainstorming-based strategies. Systematic reviews reveal that emerging technologies, including virtual reality–supported brainstorming, can expand opportunities for idea exploration and creative performance by providing immersive and interactive learning environments (Li et al., 2022; Gong et al., 2022). However, these benefits are contingent upon instructional design quality, clarity of implementation, and learners' technological readiness. Additionally, meta-level evidence emphasizes that teacher preparedness, time management, and a supportive classroom climate are critical contextual conditions that determine the success of creativity-oriented instruction (Doğan & Batdı, 2021).

Implementation Challenges and Pedagogical Constraints

Despite the overall positive findings, several studies identify implementation challenges that may limit the effectiveness of brainstorming and collaborative learning strategies. Constraints related to teacher readiness, insufficient instructional time, and unsupportive classroom environments are frequently reported as barriers to successful implementation (Doğan & Batdı, 2021). Moreover, while technology-enhanced brainstorming holds promise, technical limitations and usability issues may hinder its impact if not carefully addressed (Li et al., 2022; Gong et al., 2022). These challenges highlight the need for careful pedagogical planning and contextual adaptation when applying creativity-focused instructional strategies.

Tabel. 4 Educational Levels and Instructional Approaches Across Studies

Educational Level	Brainstorming	Peer Lesson	Technology-Based	Total Studies
Primary School	✓	-	-	2
Lower Secondary School	✓	-	-	4
Junior–Senior High School	✓	-	-	1
Higher Education	✓	✓	-	3
Preschool–Higher Education	✓	-	✓	1
Total	11	2	3	11

The synthesis of the eleven selected studies reveals a clear pattern in the application and outcomes of brainstorming and Peer Lesson strategies across educational contexts. As presented in Table 4, brainstorming is implemented across all educational levels, from primary education to higher education, indicating its high instructional flexibility and broad applicability in fostering creativity (Saeed & Ramdane, 2022; Boutayeb, 2024; Al Masri & Smadi, 2023). In contrast, Peer Lesson approaches appear in a limited number of studies and are predominantly situated in higher education settings, suggesting that peer-led reflective learning remains underutilized in primary and secondary education (Jayapalan et al., 2024).

Tabel. 5 Distribution of Instructional Methods and Creativity Outcomes

Instructional Method	Studies (n)	Primary Creativity Outcomes
Brainstorming	11	Flexibility, originality, fluency
Peer Lesson	2	Collaboration, reflection
Technology-Based Brainstorming	3	Idea generation, innovation

Further examination of instructional approaches, as summarized in Table 5, shows that brainstorming constitutes the dominant pedagogical method across all reviewed studies. Empirical evidence consistently links brainstorming to improvements in divergent thinking skills, particularly flexibility, originality, and fluency (Saeed & Ramdane, 2022; Segundo-Marcos et al., 2023). Meanwhile, studies incorporating Peer Lesson strategies demonstrate stronger associations with collaboration and reflective engagement, highlighting the role of peer interaction in supporting deeper cognitive processing and shared meaning-making (Praminingsih et al., 2023; Jayapalan et al., 2024). Technology-based brainstorming approaches, although limited in number, are primarily employed to enhance idea generation and innovation through digital or immersive environments (Li et al., 2022; Gong et al., 2022).

Tabel. 6 Frequency of Positive Effects on Creativity Indicators

Creativity Indicator	Studies (n/11)	Percentage (%)
Flexibility	11	100
Originality	11	100
Fluency	8	72.7
Innovation	8	72.7
Collaboration	6	54.5
Reflection	3	27.3

The distribution of creativity indicators across studies, as shown in Table 6, indicates that flexibility and originality are the most consistently reported outcomes, with all studies documenting positive effects in these dimensions. Fluency and innovation are also frequently observed, though with slightly lower prevalence. In contrast, collaboration and reflection emerge less consistently, suggesting that social and metacognitive aspects of

creativity are not systematically addressed in brainstorming-focused interventions (Doğan & Batdı, 2021; Segundo-Marcos et al., 2023).

Overall, the results suggest that while brainstorming is highly effective in strengthening core creative thinking skills, its capacity to foster reflective and collaborative dimensions of creativity remains limited when implemented in isolation. These findings underscore the importance of integrating complementary instructional strategies, such as Peer Lesson, to achieve a more holistic development of creativity across educational levels (Praminingsih et al., 2023; Jayapalan et al., 2024).

CONCLUSION

This scoping review synthesizes evidence from eleven studies examining the application of brainstorming and Peer Lesson strategies in enhancing creativity across educational contexts. The findings demonstrate that brainstorming is the most consistently applied instructional method and shows strong effectiveness in improving core dimensions of creative thinking, particularly flexibility, originality, and fluency, across primary, secondary, and higher education levels (Saeed & Ramdane, 2022; Al Masri & Smadi, 2023; Boutayeb, 2024).

However, the review also reveals that social and metacognitive dimensions of creativity, such as collaboration and reflection, are less frequently addressed when brainstorming is implemented as a stand-alone strategy. Studies that integrate Peer Lesson or collaborative learning structures indicate stronger outcomes in peer interaction, reflective engagement, and deeper conceptual understanding, particularly in higher education contexts (Praminingsih et al., 2023; Jayapalan et al., 2024). This suggests that brainstorming reaches its full pedagogical potential when combined with instructional approaches that emphasize dialogue, peer feedback, and shared meaning-making.

Additionally, the findings highlight that contextual and instructional factors including teacher readiness, classroom climate, and instructional design play a crucial role in determining the effectiveness of creativity-oriented learning strategies (Doğan & Batdı, 2021). Technology-supported brainstorming approaches, such as virtual or digital environments, offer promising opportunities to expand idea generation and innovation, yet their effectiveness depends heavily on thoughtful implementation and learner readiness (Li et al., 2022; Gong et al., 2022).

Overall, this scoping review concludes that brainstorming serves as a foundational mechanism for fostering creativity, but a more holistic development of creativity requires its integration with Peer Lesson and collaborative learning approaches. The limited number of studies explicitly examining Peer Lesson highlights a significant research gap, indicating the need for future studies to explore combined instructional models that balance divergent thinking with reflective and social learning processes across diverse educational levels.

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