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Systematic Literature Review Of Creative Thinking For Primary School Students: Trends, Influencing Factors, And Assessment Instruments

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Abstract. Creative thinking is a 21st-century skill that enables individuals to generate original ideas and innovative solutions. This study used a Systematic Literature Review (SLR) based on PRISMA 2020 of 25 articles published between 2021 and 2025 to identify elementary school students' creative thinking abilities, influencing factors, assessment instruments, and research trends. The results show that students' creative abilities are generally analyzed through four dimensions, ranging from fluency, flexibility, originality, and elaboration, using instruments such as open-ended tests, observation rubrics, or product assessments. The most influential factors include teacher facilitation and feedback, the learning environment, motivation, and student interest, while problem-based and project-based learning are the most dominant and consistently effective approaches. Research trends for 2021–2025 indicate an increase in quasi-experimental studies on learning models and the development of assessment instruments and learning media. These findings emphasize the need for more contextual and innovative learning designs, validated multimodal assessment instruments, and research with stronger designs and representative samples to improve the generalization of results

Keywords: Creative thinking, Assessment instruments, Elementary school, 21st-century skills.

INTRODUCTION

Creative thinking ability is one of the essential competencies in 21st-century education that should be developed from the elementary level. Creative thinking helps students adapt quickly when facing problems in an era of rapid advances in science and technology (Sitepu & Amidi, 2024). Indicators of creative thinking skills include fluency, flexibility, and clarity (elaboration) (Wardana et al., 2025). At the Elementary School (SD) level, creativity is not merely the ability to add variety to artistic work or play; it is an intellectual capacity that enables students to generate new ideas, solve problems in original ways, and adapt within rapidly changing environments (Oktaviani & Supriyadi, 2024). Responsive elementary education must be able to foster this ability through learning designs that provide space for exploration, experimentation, and reflection a process that relies not only on the mere provision of information but also on the development of higher-order thinking capabilities. An analysis of 25 research articles (period 2021–2025) forming the basis of this review demonstrates the importance of integrating appropriate instructional models, media, and assessment instruments in efforts to enhance elementary students' creativity.

One issue that often arises in the implementation of education is the limited conceptual ability for creative thinking (A. Dewi et al., 2024). It was found that in the implementation of instruction on creativity which is inseparable from thinking skills survey results showed relatively low learning outcomes (Nata et al., 2025). In the study by Lestari et al. (2022), primary education displayed a fairly clear tendency: active learning models such as Project-Based Learning (PjBL), Problem-Based Learning (PBL), Discovery Learning, Inquiry, RADEC, and project-based STEAM are frequently described as effective in improving creative thinking ability. Reviewing the findings of Wardana et al. (2025), creative thinking ability generally refers to Guilford's indicators of creative thinking (fluency, flexibility, originality, elaboration).

A number of quasi-experimental studies, Classroom Action Research (CAR) such as that conducted by Erisa et al. (2021), and development research (R&D) such as that carried out by Larasati and Rukmana (2024), illustrate a significant increase in students' creativity scores from pre-intervention to post-intervention conditions. Similarly, previous meta-analyses and systematic reviews have positioned PBL and PjBL as approaches that consistently show positive effects on students' creativity (Handayani & Koeswanti, 2021). These empirical findings are integrated into the dataset of 25 articles analyzed in this study.

In addition to variations in instructional models, the studies analyzed also highlight the role of media and teaching materials for example, Book Creator–based e-modules, 3D diorama media, and PAIKEM/PAIKEM-STEM teaching materials which, when designed contextually and validated, have been shown to increase students' interest, engagement, and creative capabilities (Salam & Zainuddin, 2021). R&D studies that include expert validation procedures and small-scale trials report convincing effectiveness results with increases in pretest–posttest scores and content/media feasibility indices, underscoring that the design of instructional media is a key factor in sparking classroom creativity.

Although the empirical evidence base is relatively rich, an initial review of the 25 articles reveals several systematic limitations that motivate the originality of this study. First, there is fragmentation in research focus: many studies concentrate on a single type of instructional model or on specific subject domains such as science, mathematics, and social studies (Fakhirah & Astria, 2023; Salam & Zainuddin, 2021; Azizah & Rezania, 2025; Saogo & Hardjono, 2024; E. K. Dewi & Muljani, 2024; Sitepu & Amidi, 2024), so cross-context and cross-approach portrayals remain scattered and difficult to generalize. Second, there is great diversity in assessment instruments from HOTS essay tests, product rubrics, observation sheets, and questionnaires to product documentation yet few studies include in-depth

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psychometric analyses such as systematic reliability and validity assessments, so the measurement quality of creativity cannot always be directly compared (Mawarni et al., 2022; Fitriyah et al., 2023). Third, most studies are relatively small in scale (classroom or several schools) with strong designs suitable for practice (CAR) but limited for population generalization. Fourth, publication trend mapping for the recent period (2021–2025), particularly comparisons among indexed national journals, has not been specifically charted, reducing the clarity of policy and national-level practice implications. This review seeks to address those gaps by presenting trend mapping, a synthesis of influencing factors, and a systematic inventory of instruments across the selected set of 25 articles.

Based on initial findings and identified gaps, this study formulates research questions to guide the review: (1) to identify the creative thinking abilities demonstrated by elementary school students; (2) to identify factors that influence creative thinking ability in elementary schools; (3) to analyze the research instruments used to assess students' creative thinking ability; and (4) to review articles published in journals during the 2021–2025 period (objectives, methods, and findings). Because the nature of the review is a systematic synthesis, the study focuses on empirical mapping and thematic synthesis rather than conventional quantitative hypothesis testing.

To answer these questions, the study employs a Systematic Literature Review (SLR) approach designed following PRISMA guidelines: formulating a bilingual search strategy (Indonesian and English), establishing strict inclusion–exclusion criteria (empirical elementary-school studies, publications 2021–2025, journals indexed in SINTA/Scopus), conducting title/abstract screening and full-text reading, extracting data into a standard template (author/year, objectives, design, sample, creative-thinking indicators, factors, instruments, findings, study quality scores), and presenting thematic narrative synthesis alongside simple quantitative summaries (frequency of models/interventions and types of instruments). This approach enables comparative analysis across studies and the drawing of practical implications for educators and policymakers.

Operationally, the expected outcomes of this study include: (1) a classification of the creativity dimensions most frequently measured and their operational indicators; (2) an articulation of influencing factors grounded in the analysis results; (3) an inventory of assessment instruments with notes on their validity and feasibility; and (4) recommendations for research agendas and practical implications for curriculum development, teaching-material design, and assessment practice in elementary schools. Based on the systematic and up-to-date research

mapping presented, this review is expected to provide an empirical foundation for more measurable and contextualized learning interventions to foster creativity from early school age.

This study provides a classification of the dimensions of creativity that are most often measured, ranging from fluency, flexibility, originality (novelty), and elaboration, along with their operational indicators. identifies factors (internal such as motivation and personality, external such as gender and socioeconomic status) that influence creativity based on the results of the analysis; inventorying the assessment instruments used in previous studies; and recommending a follow-up research agenda and practical implications for curriculum development, thereby confirming the unique position of this article in expanding the theoretical basis of creative thinking in primary education, particularly in Indonesia.

METHODOLOGY

The Systematic Literature Review (SLR) employed in this study was used to examine journal articles from previous research conducted between 2021 and 2025 on creative thinking in elementary schools, as a basis for asserting that creative thinking ability remains a compelling topic for current research due to its essential role in supporting 21st-century skills. The Systematic Literature Review (SLR) method is a research approach used to identify, appraise, and synthesize relevant research findings in a systematic and transparent manner. Unlike conventional narrative literature reviews, SLR follows strict protocols and stages to ensure that the search, selection, and analysis of literature are free from researcher bias and reproducible (Page et al., 2021).

The SLR applied in this research was designed and conducted with reference to the PRISMA 2020 guidelines to ensure transparency and replicability in the selection process and reporting of results (Page et al., 2021). PRISMA provides a checklist and flow diagram that help researchers document the steps of identification, screening, eligibility assessment, and study inclusion systematically, thereby minimizing the risk of selection bias (Page et al., 2021). Additionally, for the detailed reporting of search strategies (search methods), this review adopts reporting principles recommended in PRISMA-S so that search strings, accessed databases, and download parameters are fully documented (Rethlefsen, Murad, & Page, 2021).

In the identification stage, searches were conducted across several major databases and Google Scholar using a combination of bilingual keywords (Indonesian & English). All initial

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results were exported to reference management software and deduplicated; this procedure follows common practice to maintain consistency in bibliographic data (Higgins et al., 2019). During the screening and eligibility stages, two independent reviewers performed title/abstract screening and full-text reading according to pre-established inclusion–exclusion criteria. Involving two independent reviewers and an adjudication procedure (a third reviewer if necessary) is a recommended practice to enhance the reliability of study selection (Page et al., 2021; Aromataris & Munn, 2020).

Each final included study had its data extracted using a standard template (author/year, objectives, design, sample, instruments, indicators, findings, etc.). To ensure the quality of extraction and coding, the process was performed in duplicate: a primary extractor completed the template while a verifier conducted cross-checks and corrections. For comprehensive management and analysis of qualitative data (such as theme coding and thematic clustering), this research recommends the use of qualitative data–analysis software such as NVivo or Atlas.ti; the use of such software supports transparency in analytical steps and facilitates an audit trail (Bazeley & Jackson, 2013).

Quality appraisal (critical appraisal) of each study was conducted using standard tools appropriate to the study type: JBI Critical Appraisal Tools for quantitative/qualitative and R&D studies (Aromataris & Munn, 2020), and/or the Mixed Methods Appraisal Tool (MMAT) for mixed-methods studies (Hong et al., 2018). This approach allows a multi-dimensional evaluation of clarity of objectives, design appropriateness, sample size and sampling techniques, instrument quality, and transparency of analysis. Appraisal results were recorded and used as interpretive context, for example by weighting more heavily findings that are consistent among higher-quality studies (Aromataris & Munn, 2020; Hong et al., 2018).

Synthesis was carried out through a combination of thematic narrative synthesis and descriptive quantitative analysis. Descriptive quantitative analysis (frequencies of instructional models, distribution of instrument types, publication distribution by year, and indexing in SINTA vs. Scopus) was used to enrich the empirical picture and facilitate visualization of results (Higgins et al., 2019). Berikut hasil seleksi jurnal uang disesuaikan dengan topik yang diteliti:

Table 1. Journal Analysis Results

Selection Stage	Number of Articles
Initially found (search results)	1000

After duplicate removal	200
Passed title/abstract screening	80
Full text evaluated	80
Included in final synthesis	25

Ethically, although the SLR does not collect primary data, this study adheres to correct citation and attribution practices by recording original sources in full. Limitations of SLRs, including potential publication bias and language restrictions, are acknowledged and mitigated through reference chaining and the use of multiple databases to broaden coverage (Page et al., 2021; Rethlefsen et al., 2021). As a contextual example, similar SLRs in education that combined national (SINTA) and international (Scopus) databases have been reported effective in capturing relevant recent literature (Lestari, Nurbaeti, & Wahyudiana, 2022; Wardana, Sukartiningsih, & Mariana, 2025).

RESULTS AND DISCUSSION

A synthesis of the 25 studies analyzed shows a consistent pattern that increased creativity in elementary school students depends primarily on a combination of active learning models (PBL/PjBL, RADEC, STEAM, Inquiry/Discovery) and the role of teachers as facilitators who provide scaffolding, feedback, and space for exploration. Although each study used different media and contexts, the core relationship that emerged remained similar: quality of teacher implementation → effectiveness of the learning model → increased student motivation and engagement → improvement in creativity dimensions (fluency, flexibility, originality, elaboration). Thus, the findings are not only descriptive but reveal a broader and more stable pattern of causal relationships across studies, including variations in effects that can be explained by differences in school context, assessment instruments, and intervention duration.

These findings are consistent with the Componential Theory of Creativity, which emphasizes that optimal creativity emerges when domain skills, creative processes, and motivation synergize in learning design (Amabile, 1983). Recent empirical evidence at the elementary school level supports this mechanism: several quasi-experimental and experimental studies show that project-based interventions (PjBL/PBL) that combine meaningful tasks and real products improve creativity indicators such as fluency, originality, and elaboration (Pangestu et al., 2024; Sasmita & Kusuma, 2023). Furthermore, research examining scaffolding practices

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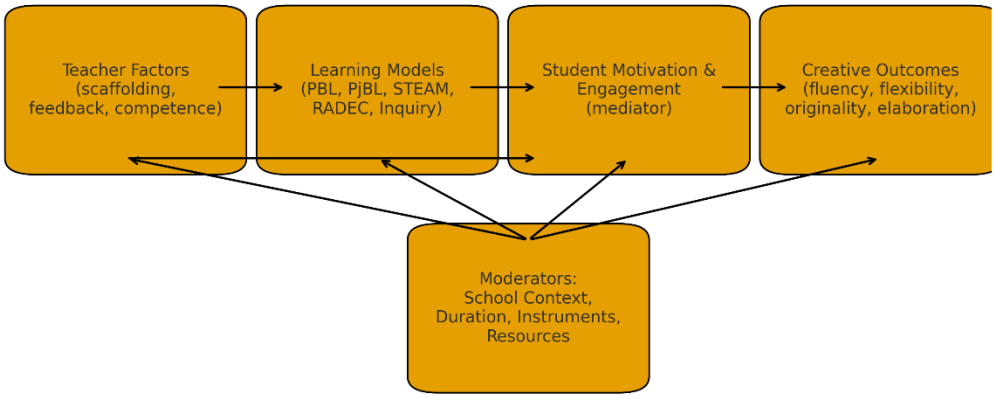
in the context of PBL reports positive effects on creative thinking abilities suggesting that the quality of scaffolding and teacher feedback serve as mechanisms that amplify instructional effects (Ernawati et al., 2023). These findings confirm that motivation/engagement acts as an important mediator between instructional design and creative output; therefore, effective interventions tend to be multilevel—strengthening teachers' competence to provide quality scaffolding, designing open-ended tasks with contextual media, and using validated assessment instruments to comprehensively capture the dimensions of creativity (Amabile, 1983; Ernawati et al., 2023; Pangestu et al., 2024).

Figure 1. Journal Analysis Results



Based on this integration, a conceptual model was developed to integrate the relationships between factors (Figure 1). This model shows that teacher factors (competence, scaffolding strategies, quality of feedback) have a direct effect on the effectiveness of active learning models, which then influence motivation and engagement as key mediators before resulting in increased creativity. Meanwhile, contextual factors such as intervention duration, sample size, instrument validity, and school culture act as moderators that strengthen or weaken the relationships between components. This framework not only facilitates understanding of the relationships found across studies, but also provides a strong theoretical basis for designing

more effective learning interventions that can be replicated in other elementary school contexts.

The following analysis table can be attached by the researcher, covering the author, year, main results and findings, and the instruments used:

Table 2. Journal Analysis Results

Author	Results & Findings	Factors Influencing	Instruments
(Erisa et al., 2021)	The implementation of the PBL model increased students' creative thinking ability (average creativity score rose from 26% pre-cycle to 78% in cycle II). The proportion of creative students increased by 52%.	Lack of innovative methodological support; teachers tend to use lecturing methods (which insufficiently facilitate creativity).	Interview guidelines, observation sheets, and tests (questions) to measure students' creativity.
(Azizah & Rezania, 2025)	The use of the Problem-Based Learning model (PBL) significantly improved students' creative thinking ability (paired t-test: p = 0.000). Pre-test scores were in the "moderately creative" category and increased to the "creative" category at post-test.	– (not discussed explicitly)	Creative thinking ability test instrument (8 HOTS-based questions).
(Martiana, 2021)	Scaffolding-based instruction increased students' creativity. The percentage of students at	Scaled teacher scaffolding helps develop students' creativity.	Student Worksheet (LKS), scaffolding guidelines, test questions, and student observation sheets.

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	the "moderately creative" level rose from 33.33% (pre-cycle) to 77.78% (cycle II). Student activeness and mastery also increased (66.67% → 88.89%).		
(Saogo & Hardjono, 2024)	Students' creative thinking ability increased significantly: from 39% (pre-cycle) to 86% (cycle II). Science learning outcomes also rose dramatically (class mastery from 18% to 89%). The inquiry model improved student understanding and creativity in science lessons.	Teachers' conventional lecturing methods are identified as inhibiting students' creativity.	Observation sheets, written tests, and non-test instruments to assess students' creativity.
(Hastawan et al., 2023)	Students' critical thinking rose from 70.58% (cycle I) to 85.35% (cycle III), and creative thinking (measured via concept-map tasks) rose from 52.94% to 82.35%. PBL encouraged higher analytical and creative thinking compared with conventional instruction.	The teacher's role as a facilitator (non-dominant) encourages students' engagement in creative thinking	HOTS questions (high-level problem-solving) and concept map creation tasks to measure creative thinking.

(Amalia & Surtikanti, 2024)	The application of Project Based Learning (PjBL) contributed to achieving SDG target 2 (Zero Hunger) while developing students' creative thinking. The review shows that with PjBL students engage in innovative projects (e.g., food-product development or local-product utilization) that stimulate their creative thinking processes.	The project-based learning context (SDG 2) and collaborative activities influence creativity enhancement. Innovation within projects (e.g., product design), the use of local resources, and collaborative processes in PjBL stimulate students to generate creative ideas.	Instrumen berupa The instrument consisted of secondary data sources (16 Scopus-indexed articles) analyzed qualitatively. Data collection was conducted using scientific search engines (Google Chrome/Google Scholar) and systematic reference management (PRISMA).
(Amalia & Surtikanti, 2024)	After implementing Discovery Learning, students' creative thinking ability increased significantly. The percentage of students who mastered creative thinking rose from 46.5% (pre-cycle) to 64.3% (cycle I) and 92.9% (cycle II). Improvements were evident in solving problems intelligently and completing creative tasks. Student learning activity also increased in each cycle	The main factor is the Discovery Learning model itself. Active, exploratory, and participatory learning processes encourage students to innovate and think creatively. The increase in creativity is supported by higher learning activity and	Instruments included student activity observation sheets and learning outcome test sheets (daily tests) to measure creative thinking. Data were analyzed descriptively to determine the percentage of creative thinking mastery.

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		challenges to solve problems independently.	
(Handayani & Koeswanti, 2021)	A meta-analysis indicated that PBL significantly enhances students' creative thinking. Creativity gains ranged from 2.65% (lowest) to 19.90% (highest), with an average increase of about 11–13%. This suggests that PBL generally has a positive effect on student creativity.	The PBL model, as an active learning approach, is a key factor. PBL places students in real-life problems that drive exploration and creativity in finding solutions. Other supporting factors include students' independent and collaborative involvement in problem-solving processes.	Ihe instrument consisted of data and experimental results from 17 PBL studies analyzed. The articles served as secondary data sources; a meta-analysis was conducted to calculate the effect size of creative thinking improvement through PBL.
(Sari et al., 2023)	Increases in students' creative thinking ability were observed in meetings 3 and 4. By the third meeting students began to demonstrate problem-solving skills (e.g., creating a mechanical generator), and creativity became evident in the third/fourth meetings when students realized aesthetically	Implementation of project-based STEAM stimulates students' creativity. Students are encouraged to plan problem solutions, think flexibly, and design products	Instruments included observation sheets and interview guidelines to assess the development of students' critical and creative thinking during STEAM project activities.

	innovative “dream houses.” Final products (miniature house + generator) showed students’ design creativity.kreativitas desain siswa.	with high aesthetic value. The collaborative and exploratory STEAM environment (integration of S-T-E-A-M) serves as the main supporting factor for creativity growth.	
(Mufidah & Subhi, 2023)	A literature review concluded that PBL implementation can improve students’ creative thinking while fostering curiosity. Indicators of emerging curiosity include material exploration, desire to study deeper, seeking additional information, and asking questions.	PBL as a problem-based learning model is the main factor. It presents real-world problems that encourage students to actively seek solutions, sharpening their motivation and creativity. PBL also strengthens students’ curiosity through the need to gather information to solve problems.	The instrument consisted of literature review data obtained from books and scientific articles related to PBL, creativity, and curiosity. As a literature study, no experimental instruments were used; analysis was conducted descriptively and qualitatively on these sources.

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(Aliyah & Purwati, 2024)	The implementation of PjBL combined with 3D diorama media successfully increased student creativity. Average student creativity rose 18% from pre-cycle to Cycle I, and increased another 23% in Cycle II.	Initial obstacles included less interactive learning (conventional media) and limited space for expressing ideas, resulting in suboptimal creativity. The use of PjBL and 3D dioramas was proposed as a solution.	Observation (creativity rubric), interviews, documentation, and multiple-choice tests using Quizizz.
(Nurjannah et al., 2023)	The RADEC learning model significantly increased student creativity. Hypothesis testing (Independent t-test) showed significance at 0.000 < 0.05, meaning H_0 was rejected; post-RADEC creative ability was higher.	Previous science learning was still conventional (question–answer) so students' creativity remained low; the RADEC model was implemented as an instructional innovation..	Essay test (10 questions) to measure creative thinking and learning documentation.
(Sinaga et al., 2024)	Students' creativity scores increased significantly: mean pretest 59.92 to mean posttest 88.25; N-Gain = 0.7268 (high category).	The PBL (problem-solving) model was implemented as an intervention; this innovative approach is	Essay test (6 questions) to measure students' creative thinking (including item validity testing).

		considered to stimulate students' creativity in problem-solving.	
(E. K. Dewi & Muljani, 2024)	The proportion of mastery in creative thinking > 75% in both experimental and control classes. – Average student creativity in ethnoscience PjBL ≥ individual KKM. – Two-tailed tests showed ethnoscience PjBL teaching materials had a significant effect on student creativity. – N-Gain for the experimental class = 0.4 (moderate), control = 0.3 (moderate).	The learning process has not yet integrated ethnoscience and local wisdom contexts; exploration of local culture (ethnoscience) in new learning materials is expected to motivate students' creativity.	Observation, written tests, questionnaires, and documentation (as evaluation instruments for development).
(Susanti et al., 2023)	Mean creative thinking scores increased (pretest–posttest); N-Gain = 77 (effective category) indicates CPS was effective in implementation.	Before the intervention, 95% of students had difficulty solving problems (mathematics), indicating a low level of initial creative thinking skills.	Test questions (pretest and posttest) to measure students' creative thinking ability.

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(Fakhirah & Astria, 2023)	Distribution: 1 student very creative, 3 creative, 3 moderately creative, and 18 less creative. Indicator analysis: fluency at a moderate criterion, while flexibility and originality were at a low criterion.	No specific external factors were identified; internal factors such as misunderstanding of question instructions caused some students to struggle in responding creatively (e.g., R-03 did not understand the task's intent).	Creative thinking ability tests, in-depth interviews, and observation documentation.
(Rohayu et al., 2021)	Use of instructional media generally increased students' creative thinking ability, with an average improvement reaching 80.74%. Although results varied across studies, the majority show improvement in creative thinking after media use.	Variation in results is due to differences in research objects, approaches, principles, and concepts used in each study. The use of media (type and mode of implementation) is a key factor for improvement.	Literature analysis/meta-analysis of 10 relevant journals (secondary data).
(Salam et al., 2021)	The STEM-based science teaching material (PAIKEM) developed had high validity (score	The mismatch between old instructional models and	Instruments: material/media expert validation sheets, attractiveness and

	86.38%, "very feasible" category), attractiveness 98.21%, practicality 98.50%. Effectiveness tests showed mean scores rose from pretest 33.83 to posttest 76.83 (mastery from 5.55% ⇒ 91.66%).	energy material hindered initial creativity; the use of STEM/PAIKEM-based teaching materials and contextual learning experiences were identified as supporting factors in creativity improvement.	practicality questionnaires (students & teachers), and creative thinking tests (pretest and posttest).
(Larasati & Rukmana, 2024)	The integrated science e-module combining the scientific approach and creative-thinking skills was validated as very feasible: content experts (88.33%), media experts (97.22%), pedagogic experts (88.33%), and fourth-grade teachers (90%). A large-scale trial (n = 34) showed an average score of 88.5% ("Very Feasible" category).	The integration of the scientific approach and interactive content (Book Creator application) in e-modules fosters students' interest and science creativity. The inclusion of tasks that stimulate creative thinking is a key factor in module design.	Instruments: content validation sheets by material/media/pedagogical experts and teachers; student response questionnaires (scale 1–4 for curriculum relevance, appearance, material presentation, and ease of use).
(A. Dewi et al., 2024)	Main inhibiting factors for students' creative thinking: inability to think independently; the	Teacher dominance and traditional teaching methods	Instruments: teacher/student interview guidelines, classroom observation sheets,

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	education system's reliance on conventional methods; teacher dominance in the learning process. Low student activeness (rarely asking/expressing opinions) further worsens creativity..	hinder students' initiative in creative thinking; limited opportunities for participation (e.g., Q&A) are also inhibiting factors.	student questionnaires, and learning document analysis.
(Wardana et al., 2025)	Identified research trends on creative thinking in elementary schools: leading journals (Thinking Skills and Creativity, British Journal of Educational Technology, etc.), active researchers, and dominance of qualitative methods (descriptive, case studies, phenomenology, grounded theory, ethnography). Frequently discussed creative-thinking frameworks include Wallas, Rawlinson, and Osborn models.	– (not discussed explicitly)	Literature analysis (Scopus articles 2013–2024)
(I. Lestari et al., 2022)	Provides an overview of creative thinking and media technology in elementary schools: presenting influencing factors, methods/techniques used	Teaching methods and media used (such as mind mapping, structured discovery worksheets,	– (articles as data sources)

	(e.g., digital storytelling, ICT), and research trends 2010–2022. Specific findings: digital storytelling in English classes increases student creativity (learning motivation and oral fluency improved); ICT use increases science literacy and creativity in elementary students.	digital storytelling), along with the teacher's role as a facilitator of creative learning, are reported to influence students' creativity.	
(R. Lestari & Lingga, 2024)	Observations/questionnaire results show most students fall in the "moderately creative" category (21.8% "always", 31.4% "often", 36.6% "sometimes"). Findings indicate limited creative engagement (many students passive during tasks)	The main inhibiting factors include dependence on conventional teaching methods and teacher dominance (resulting in low active participation), along with internal factors such as students' lack of confidence, fear of trying new ideas, and distractions (students feeling sleepy, playing, or chatting during class).	Interview guidelines, observations, questionnaires, and documentation.

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(Rahayu et al., 2022)	Students are not yet able to develop ideas widely. Mean scores for narrative writing creativity: fluency 56%, flexibility 65%, originality 63%, elaboration 45% (out of 25 students, 6 students did not meet creativity criteria). Many student ideas were not elaborated and sentences remained imprecise.	– (not discussed explicitly)	Written test (narrative composition), interviews, observations, and documentation.
(Oktaviani & Supriyadi, 2024)	Market Day activities (entrepreneurship simulation) fostered students' creative thinking across the four indicators: fluent, flexible, original, and detailed thinking. Students actively produced unique ideas (observing and modifying products) and designed promotions (brochures, posters) to attract buyers.	The collaborative and contextual Market Day learning context, along with teacher guidance, was reported to support the development of students' creativity.	Observations, interviews, and documentation.

1. Overview of study selection and characteristics

The selection process conducted in accordance with the PRISMA 2020 guidelines resulted in the inclusion of 25 empirical articles that met the following criteria: research conducted at the

elementary school level, published between 2021–2025, available in full text, and focused on creative thinking ability, influencing factors, or assessment instruments (see appendix for article list, source: ICEE Journal Analysis). Procedurally, the search across national and international databases (SINTA, Google Scholar, university repositories) was complemented by title/abstract screening and full-text review, resulting in a final set representing a combination of Classroom Action Research (CAR), quasi-experimental studies, development research (R&D), descriptive qualitative studies, and several secondary reviews/syntheses. The numerical details of the identification phase (number of initial results, deduplication, etc.) were recorded in the internal PRISMA protocol; the key point for this synthesis is that the analysis focuses on 25 systematically selected studies.

From a methodological perspective, the corpus reveals distinctive research practices characterized by: (1) the dominance of classroom intervention studies (CAR and quasi-experiments) testing active learning models (e.g., Project-Based Learning / PjBL, Problem-Based Learning / PBL, RADEC, Creative Problem Solving, Discovery Learning, STEAM); (2) a number of development (R&D) studies producing modules, media, or assessment instruments for creative thinking; and (3) qualitative studies exploring creative processes within specific activity contexts such as Market Day and design projects. This pattern reflects an application-oriented (practice–approach) research orientation on creative thinking topics at the elementary level. Concrete examples can be found in the studies of Erisa et al. (PjBL, CAR), Larasati & Rukmana (2024) (Book Creator e-module R&D), Zulayani (Discovery Learning, CAR), and Rohayu et al.

2. Publication Trends and Topical Focus

Temporal analysis of the studies (2021–2025) shows an increasing attention to the topic of creative thinking in elementary schools in recent years. Beyond the growing volume of publications, there is a noticeable shift in focus from early descriptive studies toward intervention evaluations and instrument development. Several broader-range SLRs (Wardana et al., 2025; Lestari et al., 2022) confirm a similar pattern: educational creativity literature has evolved from contextual mapping toward more measurable examinations of pedagogical practices. The findings of this corpus align with this trend many articles report pre–post results or Classroom Action Research (CAR) cycle designs to assess the effects of active learning models.

Topically, most studies explore creativity within the contexts of science, mathematics, thematic learning, or project-based activities. Project-based and problem-based learning models

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emerge as the most frequently tested approaches (examples: Erisa et al., Innestasia et al., Maghfirotul Aliyah & Panca Dewi Purwati). This is pedagogically reasonable, as project activities provide authentic contexts that enable the emergence of original ideas and product development, making their effectiveness signals appear repeatedly across the corpus of creativity indikators.

3. Forms of Creative Thinking Skills Assessed

Most studies employ traditional creativity indicators commonly found in educational literature: fluency, flexibility, originality, and elaboration. The measurement tools vary: some studies use written tests in the format of HOTS (higher-order thinking tasks), others rely on project rubrics, while several combine observation, interviews, and product documents (portfolios). For instance, a study on Market Day tasks assessed the four indicators through students' products and promotional activities; Rahayu et al.'s research evaluated narrative writing creativity using fluency–originality–elaboration scores; and Larasati & Rukmana's R&D study on e-modules measured the module's effectiveness through structured creative task indicators. This heterogeneity of instruments demonstrates that the construct of creativity is operationalized pragmatically according to each study's context.

4. Factors Influencing Elementary School Students' Creative Thinking Ability

The thematic synthesis groups the influencing factors into three main categories:

1. Pedagogical factors (learning models, task strategies, use of media),
2. Teacher and implementation factors (facilitator role, scaffolding ability, feedback style), and
3. Student and contextual factors (motivation, self-confidence, prior experience, school culture).

The corpus provides strong evidence that active learning models particularly PBL/PjBL, RADEC, CPS, and Discovery Learning are dominant pedagogical factors positively correlated with increased creativity (many intervention studies report significant pre–post score gains). For example, Erisa et al. reported an average increase in creativity scores from 26% in the pre-cycle to 78% in cycle II, while other studies noted high N-gain values following PBL or RADEC implementation.

Furthermore, the quality of teacher implementation determines the magnitude of the effect. Many Classroom Action Research (CAR) studies emphasize the teacher's role as a facilitator

who provides constructive feedback, allows sufficient thinking time, and designs “low floor–high ceiling” tasks. Conversely, traditional practices (teacher-centered lectures) are repeatedly identified as major inhibitors of creativity (e.g., Lestari & Lingga, 2024; Reni Lestari et al.). Thus, changes in learning models without corresponding improvement in pedagogical competence may yield significantly smaller effects.

The use of contextual media and teaching materials (interactive e-modules, PAIKEM/STEM-based materials, 3D dioramas, digital storytelling) also plays a significant role particularly in facilitating idea elaboration and originality. R&D studies (e.g., Larasati & Rukmana; Larasati et al.; Haerul Salam et al.) report that validated and practical modules enhance students’ interest and creative performance in applied tasks. On the other hand, the variability of media impact depends on task design and pedagogical integration, rather than merely the availability of media.

5. Assessment Instruments: Types, Validity, and Practical Application

The corpus analysis reveals a diversity of measurement instruments:

a. written HOTS tests or essay questions
b. product rubrics or performance assessments,
c. observation sheets for creative behavior,
d. product portfolios/documentation, and
e. perception questionnaires or surveys.

R&D studies stand out in their efforts to validate instruments several report content validity testing by expert panels as well as reliability analysis (Cronbach’s alpha or item analysis) on pilot samples. However, the majority of classroom-based studies (CAR/small-scale experiments) use contextually developed instruments, often reporting only content validity or feasibility without deeper psychometric analyses (e.g., factor analysis, Rasch modeling). This results in limitations when comparing findings quantitatively across studies.

From a practical standpoint, the corpus suggests that combining multiple instruments (triangulation: test + observation + product) enhances the construct validity of creativity assessment an observation consistent with assessment literature emphasizing that creativity, being complex, requires a multimodal approach. Nevertheless, the need for standardized instruments with robust psychometric validation tailored to the local elementary school context remains crucial, particularly when research aims at generalization or longitudinal measurement.

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f. Comparison of Findings with Previous Studies/Reviews

The strength of the corpus lies in: (1) practical relevance many studies were conducted in real classroom settings, making the findings applicable; (2) the use of intervention designs that allow measurement of change (pre–post, Classroom Action Research cycles); and (3) the diversity of approaches (R&D, CAR, quasi-experiments, qualitative studies) spanning various subjects and contexts.

However, several methodological limitations consistently emerge and must be acknowledged. First, small sample sizes (often a single class or a few classes) limit generalizability. Second, many studies employ pre–post designs without control groups, so threats to internal validity (e.g., history, maturation, or instrumentation effects) should be considered. Third, inconsistency of instruments (absence of uniform measurement standards) complicates quantitative integration across studies. Fourth, potential researcher bias in Classroom Action Research (teacher-researchers) can steer interpretations toward positive outcomes when no blinding or external control mechanisms are applied. Fifth, the scarcity of longitudinal studies limits understanding of the durability of intervention effects on children's creativity. Together, these weaknesses indicate the need for future studies to adopt more robust quasi-experimental designs with control groups, representative samples, and strong instrument validation to strengthen evidence and generalizability.

g. Comparison of Findings with Previous Studies/Reviews

The results of this synthesis correspond with several previous systematic reviews and meta-analyses that found PBL and other active models effective in enhancing students' creativity (e.g., the meta-summary by Anik Handayani & Henny Dewi Koeswanti; Wardana et al., 2025). However, differences emerge in the reported effect sizes: some meta-analyses report moderate effects (average increases of around 10–15%), whereas classroom action studies report substantial gains in small samples (for example, a 52% increase in Erisa et al.). These discrepancies are unsurprising given variations in design, sample size, and instruments used. Therefore, interpretation should take into account each study's methodological context an observation consistent in the education literature: intervention effects tend to be larger in small, well-controlled studies than in large-scale studies without controls.

Furthermore, the synthesis underscores the growing attention to media and instrument development during 2021–2025. R&D studies that report instrument validation and field trials (e.g., Book Creator e-modules, PAIKEM/STEM teaching materials) add evidence that the

quality of teaching-material design is important for stimulating creativity findings that align with reviews on learning technologies emphasizing the need to integrate pedagogy with media design (Lestari et al., 2022). Nevertheless, earlier literature also highlights the need for measurement standardization, which remains incompletely addressed in the local corpus.

h. Theoretical and Practical Implications

Theoretically, this synthesis reinforces the idea that creative thinking is a multidimensional construct best measured through multimodal approaches and influenced by interactions among task design, teachers, and the learning context. Practically, the review yields several policy and practice recommendations: (1) broadly integrate project- and problem-based learning models while providing sustained teacher training and support; (2) develop psychometrically validated assessment instruments for creative thinking tailored to the local elementary school context (e.g., Rasch modeling or factor analysis for adaptation and validation); (3) prioritize the development of contextualized teaching materials (STEM/PAIKEM, interactive e-modules) that facilitate open-ended tasks; and (4) encourage experimental and longitudinal research designs to test the durability of intervention effects. These measures will strengthen the alignment between research evidence and curriculum policy decisions.

i. Strengths and Limitations of This Systematic Literature Review (SLR)

The strength of this SLR lies in its systematic selection procedures (PRISMA), the utilization of a contemporary corpus of 25 articles (2021–2025), and a structured thematic-synthesis approach. Limitations include restricted access to full texts for certain sources, heterogeneity of instruments that precludes a full numerical meta-analysis, and reliance on reports provided by primary researchers (risk of reporting bias). Therefore, future recommendations include broadening searches across languages, encouraging the publication of raw data for re-analysis, and harmonizing creativity-assessment instruments at the national level so that data can be pooled for large-scale analyses.

CONCLUSION

The synthesis of 25 articles (2021–2025) indicates that active learning approaches when effectively implemented and supported by contextual media as well as teachers adopting a facilitator role hold strong potential to enhance elementary school students' creative thinking indicators. However, the heterogeneity of instruments, relatively small sample sizes, and methodological limitations in many studies require caution in generalizing the findings.

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Therefore, future research agendas should include: (a) the development and validation of psychometrically sound creativity instruments for the elementary school context, (b) experimental studies with control groups and more representative samples, and (c) longitudinal studies to assess the sustainability of intervention effects. These findings are expected to have direct implications for teachers, curriculum developers, and education policymakers seeking to systematically integrate creative thinking instruction into elementary school practice.

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