

Integrating STEAM into Contextual Literature Lessons: Exploring Creativity in Primary School Students

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Abstrack

Creativity is recognised as a critical skill for 21st-century learners, yet its development remains limited in elementary school literature classes, which are still dominated by conventional and non-contextual teaching methods. This study examines how contextual literature instruction, grounded in the STEAM (Science, Technology, Engineering, Arts, and Mathematics) framework, can foster creativity among primary school students. A quantitative survey method was employed, involving 80 fifth-grade students from a public school in Pekanbaru, Indonesia, who were selected through simple random sampling. Data were collected through a 35-item Likert-scale questionnaire and classroom observations based on five creativity indicators: fluency, flexibility, originality, elaboration, and imagination. Descriptive analysis showed high levels of imagination (84.2%) and active participation (85.4%), with lower outcomes in originality (75.6%) and creative collaboration (77.5%). These results indicate that STEAM-based literature learning effectively promotes student engagement, imagination, and expression, although it still requires strategies to foster individual innovation and teamwork. The study offers practical implications for educators and policymakers, including the need for teacher training in interdisciplinary pedagogy and the development of infrastructure that supports ethical, inclusive, and creative use of technology in elementary education.

Keywords: creativity, STEAM, literature learning, contextual learning

Abstrak

Kreativitas diakui sebagai keterampilan kritis bagi pelajar abad ke-21, namun pengembangan kreativitas masih terbatas dalam kelas sastra di sekolah dasar, yang masih didominasi oleh metode pengajaran konvensional dan non-kontekstual. Penelitian ini mengeksplorasi bagaimana pengajaran sastra kontekstual berdasarkan kerangka kerja STEAM (Sains, Teknologi, Teknik, Seni, dan Matematika) dapat meningkatkan kreativitas siswa sekolah dasar. Metode survei kuantitatif digunakan, melibatkan 80 siswa kelas lima dari sekolah negeri di Pekanbaru, Indonesia, yang dipilih melalui sampling acak sederhana. Data dikumpulkan melalui kuesioner skala Likert berisikan 35 item dan observasi kelas berdasarkan lima indikator kreativitas: kelancaran, fleksibilitas, keaslian, pengembangan, dan imajinasi. Analisis deskriptif menunjukkan tingkat imajinasi yang tinggi (84,2%) dan partisipasi aktif (85,4%), dengan hasil yang lebih rendah dalam keaslian (75,6%) dan kolaborasi kreatif (77,5%). Hasil ini menunjukkan bahwa pembelajaran sastra berbasis STEAM secara efektif meningkatkan keterlibatan siswa, imajinasi, dan ekspresi, meskipun masih memerlukan strategi untuk mengembangkan inovasi individu dan kerja sama tim. Studi ini memberikan implikasi praktis bagi pendidik dan pembuat kebijakan, termasuk kebutuhan akan pelatihan guru dalam pedagogi interdisipliner dan pengembangan infrastruktur yang mendukung penggunaan teknologi secara etis, inklusif, dan kreatif dalam pendidikan dasar.

Kata Kunci: kreativitas, STEAM, pembelajaran sastra, pembelajaran kontekstual

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INTRODUCTION

Creativity has become a keyword in the landscape of 21st-century education. In various global policy documents, such as the Framework for 21st Century Learning from the Partnership for 21st Century Skills (P21) and the OECD report on The Future of Education and Skills, creativity is stated as one of the key competencies that must be nurtured from an early age (Zhan et al., 2023). Basic education, particularly at the elementary school level, is a critical phase in shaping children's cognitive, affective, and psychomotor foundations, including the development of imagination and divergent thinking skills (Kyritsi & Davis, 2021). However, the reality on the ground shows that learning practices in many elementary schools are still far from the principles of contextual, meaningful, and creative learning. This is particularly evident in literature or the Indonesian language, which is often presented in a textual, reproductive manner and disconnected from students' real lives (Johnston et al., 2022).

Literature, as a vehicle for cultural and human expression, should be utilised as an educational tool that educates linguistically and fosters sensitivity, empathy, and creativity in students (Hsiao et al., 2022). However, literature learning at the elementary level in Indonesia is generally still dominated by a conventional approach, in which students are only required to understand the content of a story or answer literal questions from the text (Kijima et al., 2021). Students rarely have the space to create, interpret, or express their inner experiences through literary works (Lu et al., 2022). On the other hand, the global education world has begun to develop interdisciplinary approaches to solve the disconnect between knowledge and real-life practice. One approach that is now popular and proven effective in fostering creativity is the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach (Mangion & Riebel, 2023).

Traditional approaches to literature instruction in elementary schools typically rely on rote memorization, literal comprehension, and standardized assessments that prioritize correct answers over personal expression (Barton et al., 2024). Students are often asked to recall plot elements, identify main characters, or paraphrase text content, while opportunities to explore multiple interpretations, pose imaginative questions, or produce original responses are limited. This emphasis on reproduction rather than creation restricts students' divergent thinking and discourages emotional engagement and aesthetic appreciation—two core components of literary learning. Consequently, the classroom becomes a space for passive reception rather than active construction of meaning, stifling students' capacity for imagination, elaboration, and originality, essential elements of creative thinking.

The STEAM approach integrates five fields of knowledge into a project-based learning design that challenges students to solve problems, explore concepts, and create creative solutions (Barone & Bresler, 2000). The "A" component in STEAM, namely the Arts, provides epistemological legitimacy for the integration of artistic expression, including literature, into exploratory activities that have been more closely associated with science or technology (Conradty & Bogner, 2020). Thus, this approach opens up opportunities to position literature learning no longer as a passive, receptive activity, but as an active, creative vehicle that combines feelings, reasoning, and skills (Arpaci et al., 2023). However, although theoretically promising, the implementation of the STEAM approach in literature learning is still minimal, especially at the elementary education level. These limitations are not only due to the absence of adequate pedagogical models but also to the lack of academic studies that explore how elementary school students' creativity can develop through the contextual integration of literature and STEAM. This



study's fundamental background is the need to explore the potential of students' creativity in contextually designed literature learning based on the STEAM approach.

Recent empirical studies have demonstrated the positive impact of the STEAM approach in fostering creativity across diverse educational contexts. Internationally, research by Diego-Mantecón et al. (2021) and Conradt & Bogner (2020) found that integrating art with science and mathematics enhanced students' ability to generate innovative solutions and express complex ideas. Hardiansyah et al. (2024) showed that a differentiated STEAM-based learning model significantly improved elementary students' science problem-solving and engagement in the Indonesian context. Similarly, Vicente et al. (2020) highlighted the role of robotics-infused STEAM projects in stimulating creativity and collaboration among primary learners. Despite this growing body of research, integrating literature as a core component in STEAM-based learning remains underexplored, particularly in the Indonesian primary education landscape.

The main problem addressed by this study stems from the fact that literature learning in elementary schools has not been optimally utilized as a medium for developing students' creativity. This problem is systemic, affecting curriculum design, learning strategies, and teachers' readiness to implement interdisciplinary approaches. In practice, many teachers still interpret literature as texts that must be interpreted uniformly rather than as an imaginative process that opens up space for interpretation and creation (Barton et al., 2024). However, from a constructivist perspective, effective learning must enable students to construct meaning personally, based on their own context and experiences (Lin et al., 2023). The theoretical foundation of constructivist learning, particularly Vygotsky's social constructivism, offers a strong rationale for integrating STEAM into literature education. According to Vygotsky (1978), knowledge is actively constructed through social interaction and engagement with meaningful, real-life contexts. In STEAM-based literature learning, students not only read stories but also interact with texts by reconstructing narratives, visualizing characters, designing artefacts, and solving story-based problems collaboratively. This process engages multiple modalities—linguistic, visual, scientific, and technological—and supports higher-order cognitive skills such as synthesis, abstraction, and divergent thinking. By situating literary learning within authentic, interdisciplinary tasks, STEAM empowers students to move beyond literal interpretation and towards personal expression and creative problem-solving.

The urgency of this research is even more apparent when viewed considering empirical data. According to a national survey conducted by the Ministry of Education and Culture's Research and Development Agency (2022), only about 37.5% of elementary school students exhibited high creativity indicators during the learning process (Hardiansyah et al., 2024). Meanwhile, a survey of 200 elementary school teachers in three provinces showed that only 21% had ever used an interdisciplinary approach in teaching Indonesian language and literature (Hardiansyah et al., 2023). This data reveals a gap between the curriculum requirements that aim to develop higher-order thinking skills and the reality of classroom learning, which remains predominantly repetitive and one-way.

This condition provided a strong basis for the development and testing of a STEAM-based contextual literature approach as a potential pedagogical innovation in this study (Hughes et al., 2022). Based on the background and problems above, this study's research questions focus on three main questions: (1) How can elementary school students' creativity be facilitated through STEAM-based contextual literature learning? (2) What aspects of the STEAM approach effectively support students' creative processes



in literature learning? (3) How do students respond and develop their creativity in interactions with STEAM-based literary activities? The objectives of this study are to explore in depth how the STEAM approach in contextual literature learning can encourage the development of creativity in elementary school students. This study also aims to identify practical activities, teaching strategies, and learning media in integrating literature and STEAM. The results of this study are expected to contribute concretely to the development of innovative literature learning models relevant to the needs of 21st-century education.

Several previous studies have revealed the effectiveness of the STEAM approach in increasing students' creativity and learning motivation. For example, a study by Yakman and Lee (2012) showed that integrating STEAM into basic learning significantly improved students' critical and collaborative thinking skills. Similarly, research by Bertrand & Namukasa (2023) stated that the STEAM approach can broaden students' perspectives on solving problems and strengthen their artistic and conceptual expression skills. In Indonesia, a study conducted by Vicente et al (2020) in the context of science education showed that a project-based STEAM model successfully improved students' creativity and engagement. However, very few studies have specifically explored the integration between literature and STEAM, especially in the context of primary education. A survey by Marín-Marín et al (2021) that attempted to link children's poetry with environmental themes through simple science experiments is an interesting initial effort, but it has not developed a holistic pedagogical framework. The existing literature review also indicates that science-mathematics approaches still dominate most STEAM research, while the arts and literature dimensions have not received equal attention.

While numerous studies have explored the benefits of STEAM in science and mathematics education, a notable research gap remains regarding its application in language and literature learning, particularly at the elementary level. In Indonesia, scholarly attention has primarily focused on STEAM in science, with little emphasis on how literary competencies such as imagination, empathy, and narrative understanding—can be enhanced through interdisciplinary methods. Few empirical studies have investigated how contextualized, project-based literature learning supported by STEAM principles can foster creativity in young learners. This gap highlights the need for research that bridges the arts and sciences, proposing concrete pedagogical frameworks for integrating STEAM into early literacy education. This study aims to address that gap by examining the effectiveness of STEAM-based contextual literature instruction in enhancing student creativity in primary schools. Additionally, few studies focus on student creativity as the primary criterion for evaluating the effectiveness of interdisciplinary approaches in language or literature learning. This study aims to fill this gap by presenting empirical data and in-depth conceptual analysis. As a scientific contribution, this study offers a novel approach to learning, combining text-based, project-based, real-life context-based, and cross-disciplinary elements through the STEAM framework. This study also provides strong pedagogical and epistemological justifications that literature and STEAM are not two separate entities, but rather complementary poles in shaping creative, reflective, and innovative individuals. Thus, this study is expected to enrich academic discourse in literary education and interdisciplinary approaches and provide practical contributions to the renewal of literary learning models in elementary schools.



METHOD

This research employs a quantitative approach, utilising a survey method, which was chosen logically because the study's primary objective is to obtain an objective assessment of students' level of creativity in STEAM-based contextual literature learning. The quantitative approach allows researchers to measure observed variables systematically. At the same time, the survey method is considered appropriate because it can collect data from a large number of respondents in a relatively short time and with high efficiency (Hardiansyah et al., 2022). The use of surveys is also in line with the exploratory-quantitative nature of the research, which aims to describe general trends and patterns that emerge in the context of basic education. The population in this study consisted of all fifth-grade students in one public elementary school in Pekanbaru City that had implemented an independent curriculum and were willing to participate as a location for innovative learning trials. From this population, 80 students were selected as the research sample using simple random sampling, ensuring that everyone had an equal chance of being selected. Given the relatively homogeneous population size and the descriptive approach used, this sample size is considered sufficient to represent general trends. Most students came from lower-middle socio-economic backgrounds, with limited access to private enrichment programs or extracurricular learning opportunities. Academically, the majority demonstrated average proficiency in literacy and science, as measured by school-level assessments, with limited prior experience in interdisciplinary or STEAM-based instruction. This relatively homogeneous academic and socio-cultural context provided a suitable setting to observe the initial impact of contextual literature learning through STEAM. By situating the research in a school environment that reflects common educational realities in urban Indonesia, the findings offer empirically grounded insights. They are potentially generalizable to similar primary education settings. Understanding these background characteristics is essential for interpreting the study's outcomes and evaluating the transferability of the learning model to broader or more diverse populations.

This study was conducted through several procedural stages tailored to the developmental characteristics of elementary school students, particularly fifth graders. The research procedures are described as follows: Initial Preparation. The researcher coordinated with the school to obtain permission to conduct the study and developed a STEAM-based contextual literature learning module tailored to local folk tales, as well as simple science-based creative projects. Implementation of Learning During four sessions (each lasting two hours), teachers implemented STEAM-based literature learning using a contextual approach. Students were assigned to create creative works (picture stories, interactive posters, or mini experiments related to the story) based on the folk tales they read together. Questionnaire Distribution: After the learning cycle is completed, students are asked to fill out a questionnaire designed in the form of picture choices and simple statements appropriate for the literacy level of elementary school students. Direct Observation: During the learning process, researchers conduct observations using observation sheets to record indicators of students' creative behavior, such as original ideas, courage to express themselves, and active participation in STEAM projects.

The research was conducted over four instructional sessions, each lasting approximately 120 minutes, spread across two weeks. During these sessions, students engaged in contextual literature learning activities based on local folk tales, which were integrated with elements of science, technology, engineering, arts, and mathematics



(STEAM). The learning design employed a project-based approach, in which students worked primarily in small, heterogeneous groups of 4–5 members to encourage collaboration and peer interaction. In each session, students read and analysed a folk tale, identified key themes or moral messages, and were then guided to transform these into creative STEAM-based projects. Activities included designing illustrated storyboards, creating visual representations of plot structures using recyclable materials, and constructing simple scientific models (e.g., shadow puppetry with light reflection concepts) related to the narrative. Art and technology were embedded through digital drawing tools, storytelling apps, and collaborative poster design using tablets or basic multimedia software. The teacher acted as a facilitator, guiding group discussions, prompting critical questions, and scaffolding students' idea development without prescribing fixed outcomes. This open-ended facilitation encouraged student agency, allowing for divergent and imaginative responses. Integrating arts and sciences into literature aimed to enrich textual comprehension and students' capacity for innovation, experimentation, and expressive creativity.

Data Collection and Analysis: Data from the questionnaires and observations were processed and analyzed using percentages to describe the quantitative trends in students' creativity levels. To obtain quantitative data on students' creativity levels in STEAM-based contextual literature learning, this study employed a closed-ended questionnaire comprising 35 statements. This questionnaire was designed based on five leading indicators of creativity according to Torrance's theory (1974)—namely fluency, flexibility, originality, elaboration, and imagination—which have been adapted to the context of literature learning and the cognitive development characteristics of elementary school students. Each indicator is represented by several statements that describe specific aspects of students' creative behavior in responding to, processing, and expressing literary experiences in an integrated manner with STEAM-based activities. The scale used is a four-point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree), which was chosen to facilitate easier understanding and response selection for students, aligning with their individual tendencies. All statements are formulated in simple, contextual, and communicative language to ensure fifth-grade elementary school students easily understand them without compromising the validity of the measurement. This questionnaire will collect quantitative data representing students' perceptions and creative tendencies while participating in literature and STEAM integration-based learning.

Table 1.

Student Creativity Questionnaire Indicators

Creativity Indicator	Description of Questionnaire Statement
Fluency	I can generate many ideas from the story I read
Flexibility	I can change the way I tell a story or create my work
Originality	My ideas are different from those of my classmates
Elaboration	I like to add pictures, colors, or decorations to my work

In addition to questionnaires, this study also used structured observation as a supporting instrument to obtain empirical data on students' creative behavior directly during the STEAM-based contextual literature learning process. Observation was chosen because it is able to record the dynamics of student participation that are not always revealed through questionnaires, particularly in terms of spontaneous behavior, nonverbal responses, and emotional involvement in learning activities. The observation sheets were compiled based on five main indicators of creativity—fluency, flexibility, originality,



elaboration, and imagination which were translated into behaviors that could be clearly and objectively observed in the classroom. Each indicator consisted of several behavioral items that were assessed using a rating scale (1–4), ranging from “not seen” to “very prominent.” Observations are conducted directly by researchers and assisted by classroom teachers who have received prior training to ensure consistency and reliability in data recording. This instrument not only enriches the quantitative data from questionnaires but also provides a triangulation dimension to enhance the overall validity of the research findings.

Table 2.

Student Creativity Observation Indicators

Observation Indicator	Observed Behavior
Active Participation	Students actively ask questions, engage in discussions, or contribute ideas
Creative Ideas during Projects	Students produce unique works during the STEAM project
Confidence in Expression	Students confidently present or explain their work
Creative Collaboration	Students actively participate in creative group work
Response to the Story	Students are able to connect the story content with their project ideas

The data from the questionnaire and observation sheets were analyzed using quantitative descriptive techniques based on percentages. This approach was chosen because it aligned with the exploratory and descriptive nature of the study, which aimed to obtain an objective picture of students' level of creativity in STEAM-based contextual literature learning. The percentage technique enables researchers to present data in a concise, easy-to-understand, and relevant manner, tailored to the characteristics of the research subjects, specifically fifth-grade elementary school students. The questionnaire data collected from 80 respondents were calculated as percentages for each creativity indicator to determine the distribution of the tendency levels of each aspect (fluency, flexibility, originality, elaboration, and imagination). Meanwhile, observation results were analyzed using a similar approach by calculating the frequency of creative behavior based on a predetermined assessment scale. This technique was also intended to support the principle of instrument triangulation, increase the study's internal validity, and provide quantitative information that can be compared accurately and systematically across dimensions of student creativity.

RESULT AND DISCUSSION

This study presents empirical findings that describe students' creativity level in the context of STEAM-based contextual literature learning. The data obtained reveal general trends and the distribution of students' responses to various aspects of creativity that were measured. Each result is presented systematically to show development patterns, strengths, and areas that still need reinforcement in the learning process. The results are presented in detail based on five leading indicators of creativity, with a separation between students' perceptions and factual behavior in the classroom, providing a comprehensive picture of the approach's effectiveness. All results are supported by quantitative representations in tables and graphs, making it measurably easier for readers to understand the direction and quality of students' creativity development. The questionnaire, comprising 35 statements, assesses five key indicators of creativity:



fluency, flexibility, originality, elaboration, and imagination. Based on the results of data processing from 80 students, the average percentage for each indicator is as follows:

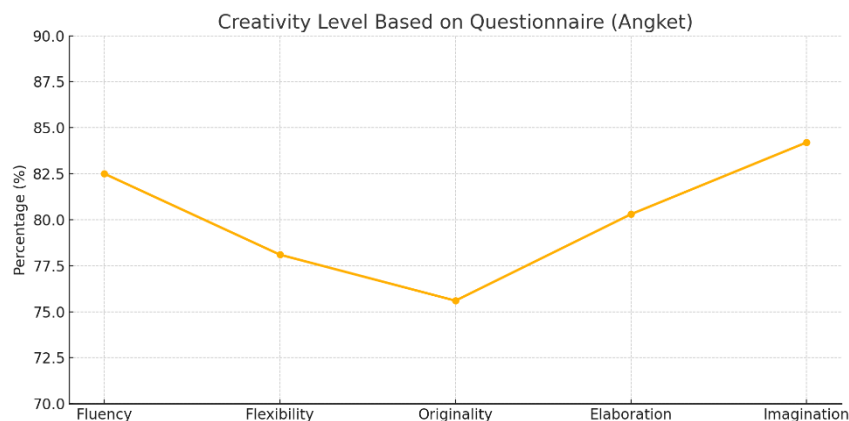
Table 3.

Creativity Indicators Based on Questionnaire Results

Creativity Indicator	Percentage (%)
Fluency	82.5%
Flexibility	78.1%
Originality	75.6%
Elaboration	80.3%
Imagination	84.2%

Diagram 1.

Creativity Level Based on Questionnaire



The results presented in Table 3 and the following line diagram illustrate the distribution of students' creativity levels based on five key indicators measured through a questionnaire instrument. Each indicator represents an essential dimension of creativity in STEAM-based contextual literature learning. The diagram also suggests that the approach used is effective in promoting creative expression across almost all aspects. Still, additional pedagogical strategies are needed to improve the quality of truly original and multidisciplinary ideas.

The imagination indicator received a score of 84.2%, indicating that students can vividly imagine stories, situations, and characters in depth. This is consistent with the STEAM approach, which allows students to interpret stories freely, visualize characters and settings, and imagine alternative plots. This imaginative ability manifests itself in the form of drawing stories, sketching characters, and recreating story situations in creative projects. This high score indicates that students understand stories passively and can "bring" narratives to life mentally and emotionally.

The fluency indicator shows that students can generate many ideas relatively quickly, with an average score of 82.5%. This indicates that students are quite productive in responding to the stories they read, both verbally and in writing. They can compose various possible endings to stories, make lists of additional characters, and ask reflective questions about the story's content. Project-based learning practices in the STEAM approach reinforce this, encouraging students to think critically, offer diverse ideas, and express their thoughts in various expressive formats. The score of 80.3% on the elaboration indicator shows that students could expand and enrich their ideas with



meaningful details. In this context, elaboration can be seen in how students added pictures, colours, supporting narratives, or details of events in their work. Many students presented projects with additional elements such as character dialogues, visual decorations, and in-depth illustrative sketches.

This is evidence that literature learning combined with visual arts and technology can encourage students to think creatively and structure their expressions in an artistic and meaningful way. With a score of 78.1%, the flexibility of thinking indicator reflects students' ability to adapt and see stories from different perspectives. During the learning process, students demonstrated the ability to adjust their storytelling style, relate stories to real-life experiences, or even transform the setting of a story to make it more contextually relevant. Although this score falls in the high category, it is still slightly below other indicators, suggesting that some students may still require encouragement to improvise more freely or transform ideas from one form to another.

This skill is essential in developing interdisciplinary thinking, a hallmark of the STEAM approach. The originality indicator received the lowest score, at 75.6%, but remained in the high category. This score indicates that, although students already possess good imagination and fluency of thought, not all can produce ideas that are entirely new and distinct from those of their peers. This low score may be due to students' limited experience interacting with diverse sources of inspiration or the strong influence of teachers' answer models in the classroom. Therefore, a more exploratory, choice-based, and creative freedom-encouraging learning approach is highly recommended to improve students' original thinking skills.

Overall, the questionnaire results indicate that the STEAM-based contextual literature approach can significantly foster creativity in elementary school students, particularly in terms of imagination, cognitive fluency, and elaboration. High scores on these indicators prove that a learning approach integrating literature, art, and science in real-life contexts provides ample space for children's creative expression. However, special attention must be given to strengthening originality and flexibility through more open, reflective, and idea-exploration-triggering learning designs. Thus, this model enhances literacy competencies and contributes to the development of creative and innovative learners from an early age.

Observations were conducted during four STEAM-based literature learning sessions to reinforce the questionnaire's findings. The observations focused on five indicators of creative behavior in students: active participation, innovative ideas, confidence in expression, collaborative creativity, and story response. The results of the observations showed the following average percentages:

Table 4.

Creativity Behavior Based on Classroom Observation

Observation Indicator	Percentage (%)
Active Participation	85.4%
Creative Ideas during Project	79.6%
Confidence in Expression	81.2%
Creative Collaboration	77.5%
Response to the Story	83.8%

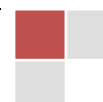
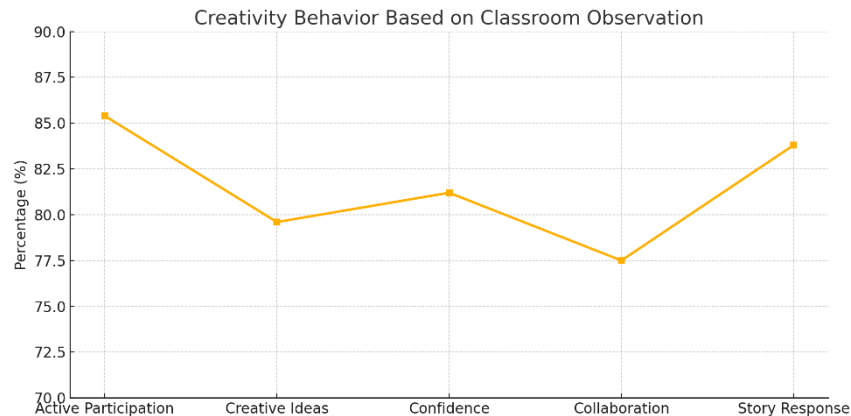


Diagram 2.
Creativity Behavior Based on Classroom Observation



The data presented in Table 4 and the following diagram visualization illustrate the creative behavior of students observed during STEAM-based contextual literature learning. Each observation indicator provides empirical evidence of how students participated, responded, and collaborated in real learning situations. The line diagram illustrates a trend of high scores across all indicators, with peaks in active participation and responses to stories, and a moderate decline in creative collaboration.

The active participation indicator yielded a score of 85.4%, indicating that students were highly engaged in learning activities. They actively asked questions, contributed ideas in discussions, and completed tasks enthusiastically. This reflects that a contextual and integrative learning environment can create an engaging learning atmosphere that encourages student involvement. The indicator of response to stories scored 83.8%, indicating that students were able to relate the content of the story to their personal experiences and transform the narrative into concrete works. This connection between text comprehension and creative expression shows that the contextual approach to literature effectively develops students' reflective and imaginative thinking.

A score of 81.2% on the indicator of confidence in expression shows that most students feel comfortable expressing their ideas and presenting their work in front of teachers and peers. This indicates a classroom atmosphere that supports open expression and freedom from fear of judgment, which is essential for fostering children's creativity. With a score of 79.6%, the 'creative ideas during the project' indicator shows that students can generate and apply new ideas in STEAM projects. For example, students created different endings, made visual models of storylines, or combined scientific elements with literary characters. Although the score is relatively high, this dimension can still be improved through more exploratory guidance.

The lowest score in the observation was found in the creative collaboration indicator, which was 77.5%. Although students worked in groups, not all were able to contribute creatively and interactively in the teamwork. This could be due to differences in social-emotional development levels or a lack of experience in project-based group work. Since teamwork is essential in the STEAM approach, this aspect needs to be strengthened through group management strategies and equitable role distribution. These findings confirm that contextually-based STEAM-based literature learning can foster creative classroom behaviors. The high level of engagement and ability to connect stories with the real world indicate that this approach successfully builds a deep and meaningful



learning climate. Meanwhile, slightly lower scores in collaboration and creative ideas in projects indicate room for improvement, particularly in designing more structured group activities that facilitate even creative contributions.

The results showed that imagination (84.2%) and active participation (85.4%) were the highest-scoring creativity indicators, suggesting that students were highly engaged and able to visualise and emotionally connect with the stories. In contrast, originality (75.6%) and creative collaboration (77.5%) were relatively lower, although still within the high category. These lower scores merit further interpretation. The limited originality may be attributed to the nature of the tasks, which, although open-ended, may have unintentionally guided students toward similar outputs due to shared materials, group discussions, or model examples provided by the teacher. Moreover, students' prior educational experiences, often shaped by rigid classroom structures and an emphasis on correct answers, could have contributed to a reluctance to take creative risks or deviate from perceived norms. Similarly, a moderate score in creative collaboration might reflect a lack of structured training in group work. While students worked in teams, many were unfamiliar with collaborative techniques that support idea-sharing, negotiation, and joint decision-making. Additionally, cultural tendencies in the classroom context, such as deference to dominant voices or hesitation to challenge peers' ideas, may have limited equal creative participation. These findings underscore the need for explicit scaffolding in group dynamics and task design that encourages divergent thinking and equitable collaboration within STEAM-based literature learning environments.

The study results indicate that STEAM-based contextual literature learning can develop various dimensions of creativity in elementary school students, both through students' internal perceptions as measured by questionnaires and through actual behavior observed during the learning process. Five leading indicators analyzed imagination, fluency, flexibility, elaboration, and originality show a high tendency with notable differences in certain aspects. These findings must be further interpreted within the relevant theoretical and literature framework.

The high scores on the imagination (84.2%) and fluency (82.5%) indicators indicate that students are not only able to vividly imagine narrative situations but also generate a variety of ideas in a relatively short time. This reinforces the social constructivist view that children construct their understanding through social interaction and contextual experiences (Hsu et al., 2023). When students are given space to interpret stories, recreate plots, or visualize story characters through projects, they maximize their imaginative and generative potential (Botella et al., 2022). This finding is also in line with those of Diego-Mantecón et al (2021), who stated that the STEAM approach enhances children's divergent thinking and imagination.

Students' responses to stories and their high levels of active participation also indicate the relevance of the results to Ausubel's theory of meaningful learning. When literary texts are linked to life experiences or used as triggers for scientific and artistic exploration, students become more engaged and motivated to express themselves (Li et al., 2022). This is reinforced by observation results showing that student active participation reached 85.4% and story response ability was 83.8%. Grounded learning in everyday contexts is key to stimulating students' emotional and intellectual engagement in literacy activities. These findings are also consistent with the research by Kyritsi & Davis (2021), which showed that integrating STEAM into project-based science learning significantly increased student engagement and creativity. In the context of literacy Pappa et al (2024), it was found that using children's poetry in conjunction with simple science



experiments could foster students' interest in learning and promote their expressive creativity. This study complements these findings by demonstrating that the literary dimension can be explicitly and systematically integrated into the STEAM approach as a thematic introduction and a valuable medium of expression, positively impacting students' creative thinking skills.

In a global context, a study by Hsiao et al (2022) shows that interdisciplinary learning that integrates art, technology, and literacy can produce pedagogical innovations that impact the development of creative competencies at various levels of education. Similarly, a study by Arpaci et al (2023) emphasizes that the success of STEAM implementation depends heavily on its ability to provide autonomy and space for exploration for students rather than merely integrating content. The results of this study reinforce both perspectives, particularly in the context of elementary education in Indonesia, that a project-based contextual approach opens up space for broader idea development and expression than conventional learning.

However, scores on originality (75.6%) and creative collaboration (77.5%) indicate challenges in fostering new ideas and innovative cooperation between students. In this context, the low originality score can be attributed to the limited encouragement for students to take risks in thinking and a tendency to follow existing examples or patterns. This suggests the need for a more exploratory pedagogical approach that allows for freedom of expression (Lu et al., 2022). Meanwhile, the low score for creative collaboration shows that although students can work in groups, not all of them can contribute actively and originally to teamwork.

From a theoretical perspective, this study's results contribute to the development of interdisciplinary learning theory, particularly the integration of literature and the STEAM approach. This study shows that literature can be taught not only as texts to be memorized and interpreted individually but also as a vehicle for expression, exploration, and reconstruction of meaning involving various domains of knowledge. This contribution reinforces the argument that creativity can be developed through the interaction between language, art, technology, and life experiences.

The findings of this study highlight the need for more targeted pedagogical strategies to foster originality and creative collaboration in STEAM-based literature learning. For educators, specific instructional practices can be implemented to address these areas. First, incorporating structured brainstorming sessions at the beginning of each project can help stimulate divergent thinking and encourage students to explore novel ideas without fear of judgment. Second, teachers should be trained to provide formative feedback that reinforces innovation, such as praising unconventional approaches or asking open-ended, exploratory questions. Third, explicit instruction in teamwork skills—such as role assignment, collaborative planning, and peer negotiation—can enhance the quality of group interaction and ensure more equitable participation in creative activities. Moreover, integrating technology can significantly support creative collaboration. Digital tools such as shared mind-mapping apps, collaborative storytelling platforms, or real-time design software can enable students to co-create content asynchronously or in parallel, allowing more voices to be heard. These technologies facilitate the exchange of ideas and help students visualise, revise, and document their creative thinking more effectively. Thus, to maximise the benefits of the STEAM approach, educators must be equipped with interdisciplinary pedagogical skills and strategies that intentionally cultivate individual originality and collective creativity.



Based on these limitations, several suggestions are proposed for future research. First, further research with broader geographical coverage and diverse school contexts is needed to test the consistency of the findings. Second, mixed-methods research can explore the affective and reflective dimensions of students' creativity in greater depth, for example, through interviews, portfolio analysis, or reflective journals. Third, it is essential to conduct longitudinal studies that assess the development of students' creativity over a longer period. Finally, future research should also further explore the use of digital technology and interactive media in STEAM-based literature learning, particularly in enhancing digital literacy.

The findings of this study also have significant social and ethical implications. Socially, the integration of STEAM in literature learning can shape a younger generation that is more reflective, critical, and open to diverse ideas. This interdisciplinary learning can also reduce the gap between science and the humanities from an early age. However, there is a risk of inequality of access, especially for schools that do not yet have adequate technological infrastructure or creative resources. In this context, policymakers must promote equitable access to technology-based creative learning facilities. Ethically, it is crucial to ensure that technology in learning remains within the bounds of child rights protection, encompassing privacy, data security, and the recognition of students' intellectual property. Teachers and schools need to be provided with clear guidelines on how technology should be used responsibly and educationally, not merely as a tool for project production. Overall, this discussion highlights that context-based literature learning and the STEAM approach not only address the challenges of the 21st century in education but also serve as a strategic medium for fostering students' creativity holistically, encompassing cognitive, social, and emotional dimensions. By integrating local cultural values, technology, and personal expression, this approach has the potential to lay the foundation for sustainable creative literacy in future generations of learners.

CONCLUSION

This study concludes that STEAM-based contextual literature learning effectively develops various dimensions of creativity in elementary school students, particularly in terms of imagination, cognitive flexibility, and elaboration. These findings suggest that integrating literature, science, art, and technology in a learning context relevant to everyday life can create meaningful and enjoyable learning experiences that encourage students' creative expression. The high level of active participation and students' ability to respond to stories is evidence that this approach stimulates cognitive, affective, and social involvement. Theoretically, the results of this study broaden the understanding of the effectiveness of interdisciplinary approaches in elementary education and contribute to the development of more innovative, integrative, and contextual learning models. Practically, this study encourages changes in learning design that are more open, collaborative, and supportive of students' freedom of expression. However, there are still challenges regarding originality and creative collaboration that require special attention in designing future learning activities. It is recommended that further research be conducted using a mixed-methods approach and a wider range of schools to test the external validity of these findings. Longitudinal research is also essential to observe the development of students' creativity over time. Additionally, the exploration of digital technology and virtual learning environments in the context of STEAM-based literature education should be expanded as a response to the dynamics of 21st-century educational transformation.



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