Project-KOMPLIT learning model (computational, creative, and literacy) in science education elementary school

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Abstract
The purpose of this study was to develop a Project KOMPLIT learning model (computational, critical, creative thinking, and literacy for elementary school students) in science education in elementary schools and to test the validity of the model that has been developed. The method used in this study is the development of ADDIE, with the research subjects being experts in elementary school science learning materials, models and languages, and practical tests for teachers, the instruments used in this study were test instruments, observations and questionnaires that included questionnaires assessing learning models, language and materials used. The data analysis techniques used in this study were quantitative and qualitative data analysis techniques. The results of the study showed that the results of the needs analysis showed that most of the research on student computational, creative and literacy still needed to be improved so that the development of a learning model was needed. The learning model developed consisted of five steps based on complete thinking skills (Computational, critical, creative, and literacy) for elementary school students. The results showed that subject matter experts gave an assessment of 88%, learning model experts 90%, language experts 93% and the teacher 89%. The developed model is equipped with a teaching model book. Based on the results of the model development, it is known that the learning model is worthy of further testing in the student learning process to improve computational skills, creative thinking, and literacy in elementary school science education.

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1. Introduction

The development of students' scientific attitude and 21st-century abilities, including reading, creativity, critical thinking, and computational thinking, are significantly influenced by the Natural Science curriculum in elementary schools. Designing and assessing complex systems in the actual world is made possible by computational thinking, which is a quantitative and analytical approach to problem-solving (Dierbach et al., 2011). Computational thinking combines the fundamental ideas of computer science with problem-solving, system design, and human behavior analysis (J. M. Wing, 2017). A methodical and disciplined approach to problem-solving, computational thinking skills are helpful in real-world situations (J. Wing, 2006). Systematic, analytical (Selby, 2013), abstract, algorithmic (Berland & Lee, 2011; Dierbach et al., 2011; Perković et al., 2010), open-minded (Lapawi & Husnin, 2016; Yadav et al., 2011), and logical computer thinking are concepts that are adopted by computational thinking skills(Selby, 2013; J. M. Wing, 2017; J. Wing, 2006). Students can learn these skills to enhance their academic performance (Durak & Saritepeci, 2017). Abstraction, algorithmic reasoning, decomposition, and pattern identification are some indicators of computational thinking abilities (J. Wing, 2006). Computational learning should be prioritized in elementary schools to help kids develop problem-solving abilities so they can confront current difficulties and have computational capabilities from a young age (Zia & Hasanah, 2024). When it comes to solving complicated problems in both ordinary and computational contexts, computational thinking can foster the development of critical, creative, and logical thinking abilities (Juldial & Haryadi, 2024).

Creative Thinking Skills are the ability to develop new methods or ideas in the form of solutions to address a problem (McGregor, 2007; Santrock, 2011; Sternberg, 2003). Creative Thinking Skills are identical to the ability to generate new ideas through the processes of deconstruction, refinement, analysis, and evaluation of ideas to produce solutions(Moeller et al., 2013). Creative thinking skills have four indicators, namely fluency, flexibility, originality, and elaboration (Yustina et al., 2022). Creative Thinking Skills train someone to innovate and formulate new ideas and solutions that have never been thought of before (Csikszentmihalyi & Wolfe, 2014; Weisberg, 2006). A person's creative thinking skills can develop through practice to hone those skills (Dilekci, A. K., 2023; Kumala et al., 2023; Weisberg, 2006). One of the efforts to develop students' thinking abilities is through the provision of open-ended questions . The provision of open-ended questions aims not to obtain the

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correct answer but to determine the level of critical, creative, and analytical thinking skills to answer them (Akmam et al., 2019; Purba et al., 2018; Yuntawati et al., 2021).

Furthermore, reading literacy is the individual's ability to understand, evaluate, and reflect on texts in order to obtain information and develop critical thinking in various life contexts (OECD, 2003). According to Gee (2015), reading literacy not only encompasses the technical aspects of recognizing letters and words but also involves a deep understanding of the meaning of texts in accordance with social and cultural contexts. Literacy is a basic skill that includes reading, writing, and the use of language to access knowledge (Adam, 2025). Vygotsky (1978) emphasized that literacy develops through social interaction, through experiences and discussions with others. state that reading comprehension is influenced by the quality of vocabulary and decoding skills possessed by the reader, involving the construction of mental models of the text based on schemas that the reader already has. According to (Duke & Pearson, 2014) effective reading strategies, such as summarizing, making inferences, and asking questions, can significantly enhance text comprehension, and teacher guidance can greatly improve students' reading comprehension by providing effective thinking strategies. Cognitive load while reading should be minimized by providing texts appropriate to the reader's developmental level, such as children's literature (Adam et al., 2025); textbooks (Setiawan et al., 2023), GLS programs .

These three skills are important for students to possess. Based on previous research related to the analysis of computational thinking skills conducted by (Aunurrahim et al., 2024; Kresnadi et al., 2023; Kumala et al., 2023, 2025; Rahayu et al., 2023; Safitri et al., 2024) and analysis creative thinking (Nurhopipah et al., 2021) are still low, still sufficient (Yasa et al., 2023; Damaiyanti et al., 2023; Dewi et al., 2023; Fakhirah & Astria, 2023; Hidayah, N. C., et al., 2021), and student literacy still needs to be improved (Amir et al., 2024; Cacik et al., 2023; Harahap et al., 2022).

In the learning process, many students experience difficulties in analyzing information, connecting concepts with everyday life, and formulating solutions to the given problems. Computational thinking, which includes problem-solving based on logical and systematic steps, has also not yet developed optimally. In addition, students' creativity in exploring new ideas as well as their literacy skills in reading, understanding, and communicating science information are still limited. The low level of these abilities indicates that the teaching methods applied have not yet fully encouraged the development of higher-order thinking skills required in the 21st century.

One of the main factors contributing to the low ability is the learning approach that is still not accustomed to training computational and creative thinking skills (Aunurrahim et al., 2024). Students mostly receive material passively and are not yet accustomed to actively participating in the learning process. The learning model applied has not yet provided space for students to think critically in solving problems, use computational concepts in data analysis, or develop creativity in generating innovative solutions. Furthermore, the lack of literacy integration in science learning causes students to struggle with understanding scientific texts, writing their observations, and communicating their findings systematically.

In line with the need to enhance computational thinking, creativity, and literacy skills, an innovative learning model is required that can accommodate the development of these skills. One of the models that can be used to develop these skills is the Project-Based Learning model, which has proven effective in enhancing conceptual understanding and developing students' thinking skills. The project-based learning model is an educational approach based on real-world problems that provide challenges for students to solve collaboratively (Baptist et al., 2020).

This model trains constructive thinking based on research towards substantial, real, and relevant problems and questions. The steps of the project-based learning model consist of (Baptist et al., 2020): Start with essential questions, 2) Design a plan for the project, 3) Create a schedule, 4) Monitoring, 5) Assessing results, and 6) Evaluating experiences. The implementation of the project-based learning model increases student engagement (Hudiananingsih, 2019), student abilities (Nurbavliyev et al., 2020), student understanding (Muhdhar et al., 2021), critical thinking (Co et al., 2018), more meaningful learning (Mou, 2024), and student learning outcomes (Lage-g & Ros, 2024). The PJBL learning model can enhance students' creativity (Yu, 2024), student engagement (Hudiananingsih, 2019), student abilities (Baptist et al., 2020; Hudiananingsih, 2019; Nurbavliyev et al., 2020), critical thinking (Muhdhar et al., 2021), and more meaningful learning (Co et al., 2018). The project-based learning model has the advantage of enhancing computational thinking skills (Csikszentmihalyi & Wolfe, 2014; Moeller et al., 2013; Yustina et al., 2022).

However, the existing model has not specifically integrated the three thinking abilities into a systematic learning approach. Therefore, the Project-KOMPLIT Learning Model (Computational, Creative, and Literacy) was developed as an innovative solution to improve the quality of science education in elementary schools. The Project-KOMPLIT Learning Model combines a project-based learning approach with the reinforcement of three main aspects, namely computational problem-solving, creativity in devising solutions, and literacy in

understanding and communicating science concepts effectively. Through this model, students not only gain a stronger conceptual understanding but also develop systematic and innovative thinking skills. This model combines computational, creative, and literacy thinking skills.

The Project-KOMPLIT Learning Model is designed to provide a more meaningful and challenging learning experience for students. Through a project-based approach, students will work on tasks that require them to think systematically using computational principles, find creative solutions, and enhance their literacy skills. Thus, students not only gain a deeper understanding of science concepts but also develop thinking skills that are more adaptive to the changing times. Previous research results indicate that project-based learning models can enhance computational thinking and creative thinking skills (Kumala, Yasa, Salimi, & Sueb, 2024; Kumala, Yasa, Salimi, Hidayah, et al., 2024; Kumala, Yasa, Wibawa, et al., 2024), as well as literacy (Eliana et al., 2016; Koparan & Güven, 2014).

Previous research includes project-Ct studies by (Ismael et al., 2024), (Azmi & Ummah, 2021), and (Shin et al., 2021), which are regular projects; (Zhang et al., 2024), (Fatmala & Marwoto, 2025), and project-STEAM (Kumala, Yasa, Salimi, & Sueb, 2024; Kumala, Yasa, Salimi, Hidayah, et al., 2024; Kumala, Yasa, Wibawa, et al., 2024); (Hamid et al., 2024) for creative projects (N. Astuti et al., 2022), machine learning for CT (Wang & Wang, 2024); PJBL (Fadhil et al., 2021; Gencer & Gonen, 2015; Prihatin et al., 2021; Purwanti, Sunarno, et al., 2022), and PJBL Literacy (Abidin et al., 2020; Imbaquingo & Cárdenas, 2023; Z.). Based on previous research, it is known that the developed learning models have not yet integrated aspects of computational thinking, creativity, and literacy.

Based on that, the formulation of this research is how to develop a learning model that can enhance computational thinking, creativity, and literacy skills. In line with the research, the objective of this study is to develop a learning model that can enhance computational thinking, creativity, and literacy skills in science education for elementary school students. The development of the KOMPLIT Project Learning Model is expected to become a more effective learning alternative in enhancing students' abilities in the field of science. This model provides space for students to learn actively, collaboratively, and exploratively, thereby developing their thinking and problem-solving skills in everyday life. In addition, this model also provides teachers with the opportunity to teach more innovatively and tailor the learning to the needs and characteristics of the students. With the implementation of the Project-KOMPLIT Model, it is expected that science education in elementary schools will become more interactive, relevant, and capable of producing students who think creatively, computationally, and possess literacy in facing future challenges.

2. Method

This research uses a ADDIE approach with the aim of developing the Project KOMPLIT learning model (computational, critical, creative thinking, and literacy for elementary school students). In ADDIE approach, there are several stages consisting of (1) the analysis stage, where the first step involves analyzing the computational, critical, creative, and literacy skills of elementary school students in science learning. Additionally, an analysis is conducted on the learning process, the worksheets used, and the results of the tests on students' computational, critical, and creative thinking abilities. The research subjects consisted of 74 elementary school students. (2) In the design phase, the researcher developed the Project-KOMPLIT learning model (computational thinking, creativity, and literacy in science learning in elementary schools). (3) In the development stage, expert validation tests are conducted, consisting of model validators, subject matter experts, and language experts. (4) In the implementation stage, it is conducted only with teachers to assess the practicality aspect from the perspective of elementary school teachers. Based on each activity, an evaluation of the implementation of the activities is conducted. To improve the implementation/stages of each research. The ADDIE Approach in Figure 1.

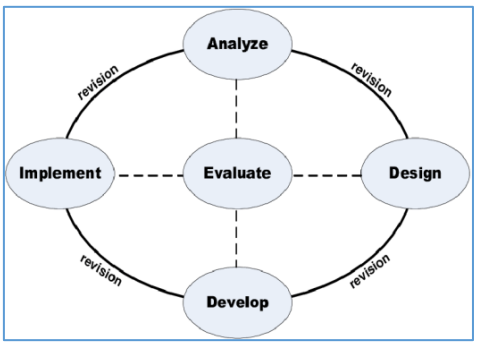

Figure 1. ADDIE Approach (Branch, 2009)

The researcher used questionnaires, tests, and observations. The questionnaire instrument is used to assess the feasibility of the learning model from the perspective of experts and also teachers as practitioners. The test instrument is used to measure computational thinking and critical thinking abilities, while observation is used to measure students' literacy skills. The test instruments were previously subjected to validity and reliability tests using Cronbach's Alpha. The data analysis technique used in this research is the quantitative data analysis technique. The qualitative data analysis technique is the Miles and Huberman data analysis technique, which aims to describe the results of feedback and the outcomes of the learning observations that have been conducted. The quantitative data analysis technique is used to calculate the assessment from questionnaires and test questions. The practicality assessment is calculated using a Likert scale with a score range of 1 to 4. After obtaining the score data, the researcher determines the feasibility criteria for the learning media, which can be seen in Table 1.

Table 1. Criteria for the Feasibility of Learning Models

Criterium	Percentage
Very Good	76% - 100%
Good	51% - 75%
Less	26% - 50%
Not good	1% - 25%

The developed Learning Model is deemed suitable for use if it achieves a result percentage of more than 75%.

3. Results and Discussion

3.1. Analysis Stage

The research begins with conducting a field needs analysis. The needs analysis was conducted by analyzing higher-order thinking skills (computational, critical, creative, and literacy). Based on the results of previous research, computational analysis at the school level includes (Budiarti, Wibowo, & Nugraheni, 2022; Jamna, Hamid, & Bakar, 2022; Kamil, Imami, & Abadi, 2021; Lestari, S., & Roesdiana, 2023; Marchelin, Hamidah, & Resti, 2022; Mufidah, 2018). An analysis of computational and critical thinking skills has been conducted by (Kumala et al., 2025). Based on the measurement results, it is known that the measurement for computational thinking skills consists of algorithmic thinking ability at 17%, pattern recognition at 64.5%, abstraction at 15.6%, and decomposition at 44.5%. Based on the data, it can be concluded that the computational thinking skills of elementary school students still need to be improved by approximately 35.4%. Meanwhile, the ability to think critically is as follows Based on graph 2, it can be seen that 51% of students are already able to identify facts, 40% have been able to find relationships between situations, 33% have been able to evaluate the impacts that occur, and 59% have been able to conclude information. The research results are shown in Figure 2 and Table 2.

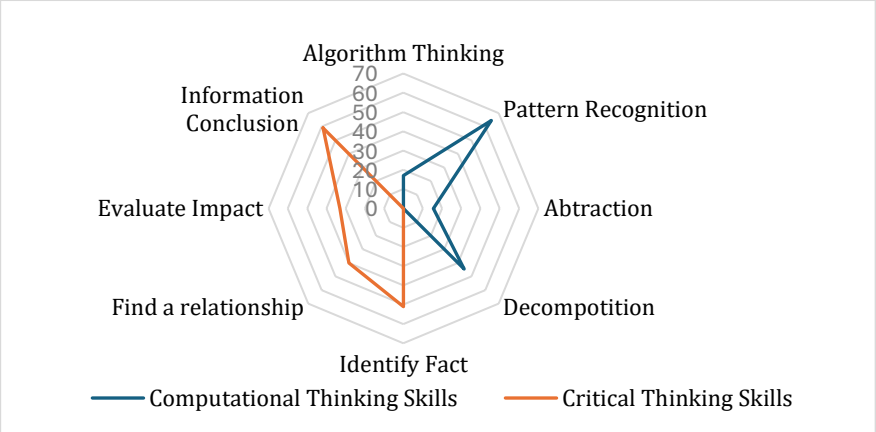

Figure 2. The analysis of computational and critical thinking skills in science education at elementary school

Table 2. Computational thinking and critical thinking skills data

Computational Thinking Skills	Result
Algorithm Thinking	17%
Pattern Recognition	64.5%
Abstraction	15.6%
Decomposition	44.5%

Computational Thinking Skills	Result
Critical Thinking Skills	
Identify Fact	51%
Find a relationship	40%
Evaluate Impact	33%
Information Conclusion	59%

Based on the obtained data, it is known that students' computational thinking and critical thinking skills still need to be improved and trained in elementary school students so that they become accustomed to having these abilities. For the data analysis of creative thinking and literacy skills, it has been conducted by several previous studies, among others These three abilities are important for students to possess. The results of observations on science learning in elementary schools show that computational and critical thinking skills (Kresnadi et al., 2023; Kumala et al., 2025; Maryam et al., 2019; Rahayu et al., 2023), and creative skills are still low, still sufficient (Z. Astuti et al., 2023; Damaiyanti et al., 2023; Dewi et al., 2023; R. Hidayah et al., 2021; Yasa et al., 2023), and student literacy still needs to be improved (Amir et al., 2024; Cacik et al., 2023; Harahap et al., 2022).

3.2. Design Stage

Based on the data from the needs analysis, it can be concluded that students' computational thinking, creativity, and literacy skills still need to be improved. One way is through the development of innovative learning models that train these three abilities. One of the learning models that can enhance students' computational thinking, creativity, and literacy skills is the Project-KOMPLIT Learning Model. The Project-KOMPLIT Learning Model is a learning approach that combines project-based learning with the integration of aspects related to computational thinking, creativity, and literacy. This model is based on Piaget's constructivist theory, which explains that a person learns from the construction of their thoughts about the environment and experiences. Based on the learning model theory, the Project-KOMPLIT Learning Model is based on project-based learning, characterized by computational thinking, creativity, and literacy skills. The project-based learning model has the advantage of enhancing computational thinking skills, creative thinking skills, real-world problem-solving skills, and developing critical and imaginative thinking abilities.

Based on the foundations of Philosophy, Psychology, Cognition, and Pedagogy, the KOMPLIT project learning model develops a constructivist learning philosophy where the acquisition of understanding is based on students' experiences derived from stimuli in their environment. Based on psychological foundations, the learning model is based on the psychosocial development of elementary school students entering the stage of Industry vs Inferiority (5-12 Years). At this stage, a child begins to feel proud of their achievements and successes. Children begin to interact with more people and pursue their academic activities. Success in socializing and achieving accomplishments will lead to a sense of competence, while failure will result in feelings of inferiority. Based on the cognitive development of students, elementary school students have entered the stage of concrete operational cognitive development, which occurs at the age of 7–11 years. At this stage, children begin to think logically and in an organized manner, but only for physical objects. Characteristics of concrete operational cognitive development include the ability for students to learn more optimally when using concrete media.

Based on that foundation, it serves as the basis for the characteristics of the learning model that will be used. Next, based on the characteristics of pedagogical learning for elementary school (SD) students, it is meaningful, thematic, and contextual learning. Pedagogical learning must also take into account the characteristics of students, such as physical, intellectual, social, emotional, moral aspects, and socio-cultural background. Characteristics of pedagogical learning Meaningful learning, Thematic learning, Contextual, Integrative, Hierarchical.

The integration of Computational Thinking Skills into the learning model is done by training students to solve problems. Computational thinking skills consist of the ability to formulate problems by applying possible solutions sequentially to obtain the most effective combination, generalizing, and transferring this process to various solutions. Problem-solving skills in learning are a fundamental part. Therefore, in learning, more emphasis is placed on understanding through observation and problem-solving activities. Computational thinking skills can be applied in mathematics and science subjects (Pei, C., Weintrop, D., & Wilensky, 2018).

Integration Creative thinking skills are developed through regular practice by presenting problems that students must solve creatively and originally in the form of open-ended questions, allowing them to formulate various alternative answers. A person can develop by practicing to hone those skills . One of the efforts to develop students' thinking abilities is through the provision of open-ended questions (Damayanti, 2018; Lely et al., 2020; Yuniarti et al., 2017.). This aims to determine the level of critical, creative, and analytical thinking skills to answer it (Kartikasari et al., 2022; Sarwanto et al., 2021). Open-ended questions related to daily life can be implemented in the subject of developing science learning in elementary school.

Integration of students' literacy skills through habituation (Apriyanda et al., 2023) of readings that contain everyday life problems. (Duke & Pearson, 2014), effective reading strategies, such as summarizing, making inferences, and asking questions, can significantly enhance text comprehension, reading for 15 minutes before starting lessons (Apriyanda et al., 2023; Fitriyaningsih, 2021). Improvement can be achieved through children's literature (Adam et al., 2025); textbook (Setiawan et al., 2023), and GLS habituation (Oktyasari et al., 2021); writing reading response journal (Padmadewi et al., 2023).

The Learning Design of the Project-KOMPLIT Learning Model is shown in Figure 3.

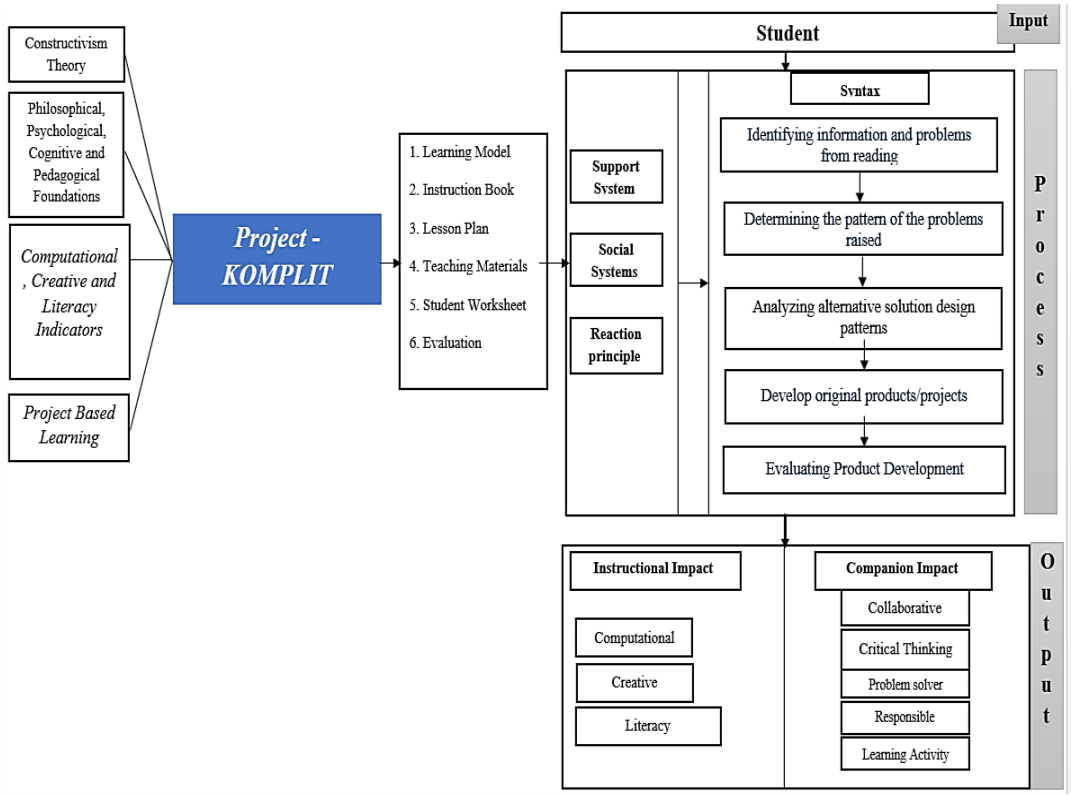

Figure 3. Hypothetical model of the Project-KOMPLIT learning model

The syntax of the Project-KOMPLIT Learning Model is as follows: In the first stage, namely identifying information and problems from the reading. At this stage, students read the information from the text provided by the teacher, then students identify the problems present in the text. At this stage, it develops students' computational thinking and literacy skills towards the given reading material. The problem developed is an authentic and contextual issue in accordance with everyday life problems. The second stage is to determine the pattern of the proposed problem. At this stage, students identify the problem patterns present in the reading. The developed problem contains two issues so that students can compare and determine the same pattern between the two problems.

At the third stage, analyzing alternative solution design patterns. At this stage, students determine the solution through several alternative answers. This aims to ensure that students do not fixate on just one answer when solving problems, allowing them to think openly. Students determine the problem-solving patterns that have been developed by the students so that they can critically identify the similarities and differences of the developed solutions. In the fourth stage, develop an original product. Students develop products based on the designs that were developed in the previous stages. The developed products can be in the form of development products and initial products according to the students' learning needs. In the fifth stage, it is the phase of evaluating the development of student products together, assessing the strengths and weaknesses of the previously developed products.

The social system in the Project-KOMPLIT Learning Model is designed through close cooperation. In this framework, students collaborate to exchange information and develop their competencies. The goal of this approach is to enhance motivation throughout the learning journey and in product development (Maria & Puente, 2013). During this learning process, each student also has the responsibility to support each other's development, while the teacher emphasizes the importance of mutual respect and the principle of equality. In addition, each individual is expected to complete their tasks well, become independent learners, apply new knowledge to solve problems, and reflect on the learning outcomes as well as the effectiveness of the strategies

used with full responsibility. The next developing social system is an open system in project planning. The principle of openness among learners aims to receive honest feedback, so that the quality of the produced product or design can be continuously developed and improved. Thus, it can be concluded that the social system in the Project-KOMPLIT Learning Model emphasizes a collaborative, responsible, independent, and open approach.

The support system in the Project-KOMPLIT Learning Model consists of educational tools such as lesson plans (RPP), teaching materials, a learning model guidebook, student worksheets, and assessment rubrics. The teaching devices and media are in accordance with the Project-KOMPLIT Learning Model. In the Project-KOMPLIT Learning Model, technological learning tools and a good internet connection are essential in the learning process. In addition, its implementation requires relevant, multidisciplinary, up-to-date learning resources and adequate network quality.

There are three principles of the Project-KOMPLIT Learning Model reaction, namely: a) providing challenges to students in the form of real-life learning problems, offering guidance and feedback to students in terms of formulating/identifying problems, determining problem patterns, developing solutions and products, and showing evaluation points for the developed products. Next, the direct impact of the learning model consists of computational thinking skills, creativity, and literacy comprehension. Meanwhile, the accompanying impacts of the model are Collaborative, Critical, Problem Solver, Responsible, and Active.

The advantage of this learning model is that it can enhance (1) active and engaged learning: In this model, students are actively involved in their learning process. They do not just listen to information, but also apply it in real contexts. (2) Development of 21st Century Skills: Students develop critical, computational, creative communication, collaboration, and creativity skills that are very important in today's workforce. (3) Development of students' reading comprehension or literacy skills, (4) Motivation and fostering interest: In learning that has relevant and engaging contexts, students are more motivated to learn. Project-based learning can spark students' interest to explore more deeply. Increasing students' enthusiasm and desire to learn, (5) Development of Problem-Solving Skills: students are faced with challenges that require them to find solutions. This helps students develop problem-solving skills that are important in everyday life. (6) Improving students' independence and confidence in facing problems.

The project-based learning model (Project-Based Learning) is effective in enhancing conceptual understanding and developing students' thinking skills. The project-based learning model is an educational approach based on real-world problems that present challenges for students to solve collaboratively. This model trains constructive thinking based on research towards substantial, real, and relevant problems and questions. The steps of the project-based learning model consist of (Baptist et al., 2020): (1) Start with essential questions, (2) Design a plan for the project, (3) Create a schedule, (4) Monitoring, 5) Assessing results, and 6) Evaluating experiences. The implementation of the project-based learning model increases student engagement (Hudiananingsih, 2019), student abilities (Nurbavliyev et al., 2020), student understanding (Muhdhar et al., 2021), critical thinking (Co et al., 2018), more meaningful learning (Mou, 2024), and student learning outcomes (Lage-g & Ros, 2024). The PJBL learning model can enhance students' creativity (Yu, 2024), student engagement (Hudiananingsih, 2019), student abilities (Baptist et al., 2020; Hudiananingsih, 2019; Nurbavliyev et al., 2020), critical thinking (Muhdhar et al., 2021), and more meaningful learning (Co et al., 2018). The project-based learning model has the advantage of enhancing computational thinking skills (Csikszentmihalyi & Wolfe, 2014; Moeller et al., 2013; Yustina et al., 2022). project-Ct by (Azmi & Ummah, 2021; Fatmala & Marwoto, 2025; Ismael et al., 2024; Kumala, Yasa, Wibawa, et al., 2024; Shin et al., 2021; Zhang et al., 2024) for creative (Purwanti, Astuti, et al., 2022), Astuti 2022, machine learning for CT (Wang & Wang, 2024); PJBL (Fadhil et al., 2021; Gencer & Gonen, 2015; Prihatin et al., 2021; Purwanti, Sunarno, et al., 2022), and PJBL Literacy (Abidin et al., 2020; Imbaquingo & Cárdenas, 2023; Z. Lestari et al., 2023).

3.3. Develop and Evaluation

The results of the model development were subsequently subjected to expert validation by learning model experts, language experts, and science material experts. The results of the expert validation are shown in Table 3.

Table 3.Model validation results by experts

No	Subject	Result	Criteria
1	Learning Model Expert	90%	Valid
2	Language Expert	93%	Valid
3	Content Expert	88%	Valid
4	Teacher	89%	Valid

Based on the results of the model validation test that has been developed, it can be concluded that the Project-KOMPLIT learning model is valid based on the results of expert tests in model, language, and science

subjects. However, there are still additional inputs from validators for the perfection of the product. Based on the suggestions and feedback, improvements were made to the practicality of the model, ensuring its suitability for learners in both steps and language used. This is because the developed model is in accordance with the concept of project-based learning and aspects of computational thinking, creativity, and literacy skills. In addition, the learning model has been analyzed for its suitability with the characteristics of elementary school students. This model is expected to develop the computational, creative, and literacy thinking skills of elementary school students, ultimately enabling them to adapt to the needs of the 21st century.

4. Conclusion

The Project-KOMPLIT Learning Model is an innovative approach in elementary science education that combines three main elements: computational, creative, and literacy. This model aims to enhance the understanding of science concepts and problem-solving skills through problem-based projects that integrate computational, creative, and literacy thinking abilities. The computational approach trains students to think logically and systematically through technology-based problem-solving. The creative aspect encourages the exploration of new and innovative ideas in the learning process. Meanwhile, literacy focuses on the ability to read, write, and understand scientific concepts effectively. This model has six main steps with a social system model consisting of openness and responsibility. By implementing Project-KOMPLIT, science learning becomes more interactive, allowing students to develop problem-solving skills and enhance their understanding of science, equipping them with critical, collaborative, and innovative thinking skills needed in the digital era. Repeated training of thinking skills makes students accustomed to mastering those thinking skills. Research recommendations suggest that the model can be practically tested in real environments through small-scale trials with students.

Author Contributions

All authors have equal contributions to the paper. All the authors have read and approved the final manuscript.

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Declaration of Conflicting Interests

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References

Abidin, Z., Utomo, A. C., Pratiwi, V., Farokhah, L., Surakarta, U. M., Jakarta, U. B., & Jakarta, U. M. (2020). Project-Based Learning - Literacy in Improving Students' Mathematical Reasoning Abilities in Elementary Schools. *JMIE: Journal of Madrasah Ibtidaiyah Education*, *4*(1), 39–52.

Adam, A., Delawanti, D., & Setiawan, D. A. (2025). Analysis of the School Literacy Movement Program (GLS) through Children's Literature in Elementary Schools in Malang Regency. *Cendikia*, *3*(1), 261–269.

Akmam, A., Anshari, R., Jalinus, N., & Amran, A. (2019). Factors influencing the critical and creative thinking skills of college students in computational physics courses. *ICOMSET2018*, 1–9. https://doi.org/10.1088/1742-6596/1317/1/012172

Amir, N. A., Irfan, M., & Raihan, S. (2024). Analysis of Primary School Students' Reading Literacy Skills in "Merdeka Curriculum" Learning in Bulukumba Regency. *Pinisi Journal of Education*, *4*(2), 224–235.

Apriyanda, Putri, S., & Raudhatul, J. (2023). Efforts to Improve Reading Literacy of Primary Level Students Through the Habituation Stage. *Tarbiyah Al Awlad*, *13*(2), 109–115.

Astuti, N., Efendi, U., & Haya, F. F. (2022). The Impact of Project Based Learning Model on Creative Thinking Ability of Forth Grade Students. *International Journal of Elementary Education*, *6*(3), 440–445.

Astuti, Z., Darmiany, & Nurmawati, I. (2023). Analysis of the Creative Thinking Ability of Fourth Grade Students in Solving Open-Ended Mathematics Problems in Terms of Learning Styles at SDN 10 Sumbawa Besar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *08*(3), 6125–6138.

Aunurrahim, M., Yurniwati, & Madani, F. (2024). Analysis of the Computational Thinking Ability of Fifth Grade Elementary School Students in Terms of Math Anxiety. *Prosiding MAHASENDIKA III Tahun 2024*, 270–285.

Azmi, R. D., & Ummah, S. K. (2021). Implementation of Project Based Learning to Explore Students' Computational Thinking Abilities. *Jurnal Ilmiah Pendidikan Matematika AL-QALASADI*, *5*(1), 52–61.

Baptist, K., Utami, D., Subali, B., & Alyosius, S. (2020). Effectiveness of project-based learning and 5e learning cycle instructional models. *Kependidikan*, *4*(1), 55–69.

Berland, M., & Lee, V. R. (2011). Collaborative strategic board games as a site for distributed computational thinking. *International Journal of Game-Based Learning*, *1*(2), 65–81. https://doi.org/10.4018/ijgbl.2011040105

Budiarti, H., Wibowo, T., & Nugraheni, P. (2022). Analisis Berpikir Komputasional Siswa dalam Menyelesaikan Masalah Matematika Herlina. *Jurnal Pendidikan MIPA*, *12*(4), 1102–1107.

Cacik, S., Wiratsiwi, W., Seftia, I., & Widiyanti, R. (2023). Analysis of the initial reading literacy skills of lower-grade elementary school students in Tuban Regency. *Jurnal ilmiah aquinas*, *6*(2), 157–165.

Co, H., Erta, H., & Aziz, İ. (2018). *The Impact of Project-Based Learning on Achievement and Student Views: The Case of AutoCAD Programming Course*. *7*(6), 67–80. https://doi.org/10.5539/jel.v7n6p67

Csikszentmihalyi, M., & Wolfe, R. (2014). *New Conceptions and Research Approaches to Creativity: Implications of a Systems Perspective for Creativity in Education*. 161–184. https://doi.org/10.1007/978-94-017-9085-7

Damaiyanti, R., Akbar, T., & Prasrihamni, M. (2023). Analysis of Students' Creative Thinking Abilities in 4th Grade Elementary School Social Studies Learning. *Didaktik: Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, *09*(September), 339–348.

Damayanti, H. T. (2018). Mathematical Creative Thinking Ability of Junior High School Students in Solving Open-Ended Problem. *Journal of Research and Advances in Mathematics Education*, *3*(1), 36–45.

Dewi, F. L., Utami, R. E., Damayani, A. T., & Sari, K. K. (2023). Analysis of the Creative Thinking Ability of Third Grade Students at Pandean Lamper 01 Public Elementary School, Semarang. *JANACITTA: Journal of Primary and Children's Education*, *6*(024), 58–56.

Dierbach, C., Hochheiser, H., Collins, S., Jerome, G., Ariza, C., Kelleher, T., Kleinsasser, W., Dehlinger, J., & Kaza, S. (2011). A model for piloting pathways for computational thinking in a general education curriculum. *SIGCSE'11 - Proceedings of the 42nd ACM Technical Symposium on Computer Science Education*, 257–262. https://doi.org/10.1145/1953163.1953243

Dilekci, A. K., H. (2023). The effects of the 21st century skills curriculum on the development of students' creative thinking skills. *Thinking Skills and Creativity*, *47*(6). https://doi.org/10.1016/j.tsc.2022.101229

Duke, N. K., & Pearson, P. D. (2014). *Effective Practices for Developing* (Issue January 2002). https://doi.org/10.1598/0872071774.10

Durak, H. Y., & Saritepeci, M. (2017). Analysis of the relation between computational thinking skills and various variables with the structural equation model. *Computers & Education*. https://doi.org/10.1016/j.compedu.2017.09.004

E, E., Senam, Wilujeng, I., & JUmadi. (2016). The Effectiveness of Project-Based E-Learning to Improve Ict Literacy. *Jurnal Pendidikan IPA Indonesia*, *5*(1), 51–55. https://doi.org/10.15294/jpii.v5i1.5789

Fadhil, M., Halim, A., Evendi, Mursal, & YUsrizal. (2021). Impact of Project Based Learning on Creative Thinking Skills and Student Learning Outcomes Impact of Project Based Learning on Creative Thinking Skills and Student Learning Outcomes. *Journal Pf Physics: Conference Series*, 1–8. https://doi.org/10.1088/1742-6596/1940/1/012114

Fakhirah, N. L., & Astria, F. P. (2023). Analisis Kemampuan Berpikir Kreatif Siswa Pada Mata Pelajaran IPA Kelas IV di SDN 36 Cakranegara. *Jurnal Ilmiah Profesi Pendidikan*, *8*(1b), 719–733.

Fatmala, R. I., & Marwoto, P. (2025). Improving Computational Thinking Skills Through the Implementation of Project-Based Learning According to Student Differentiation in Physics Learning. *Physics Communication*, *9*(1), 40–46.

Fitriyaningsih. (2021). Implementing Literacy Program for Improving Reading Ability of Elementary School Students. *Indonesian Journal of Primary Education Implementing*, *5*(1), 125–131.

Gencer, A., & Gonen, M. (2015). Examination of The Effects of Reggio Emilia Based Projects on Preschool Children's Creative Thinking Skills. *Procedia - Social and Behavioral Sciences*, *186*(312), 456–460. https://doi.org/10.1016/j.sbspro.2015.04.120

Hamid, A., Efendiy, K., & Damayanti, N. W. (2024). The Effect of Project-Based Learning Models and Learning Styles on Creative Thinking Skills of Students. *International Journal of Current Science Research and Review*, *07*(04), 2192–2202. https://doi.org/10.47191/ijcsrr/V7-i4-24

Harahap, D., Nasution, F., Sumanti, E., & Sormin, S. A. (2022). Analysis of Elementary School Students' Literacy Skills. *Jurnal Basicedu*, *6*(2), 2089–2098.

Hidayah, N. C., Ulya, H., & Masfuah, S. (2021). Analysis of Elementary School Students' Creative Thinking Abilities Based on Mathematical Ability Levels. J*urnal Educatio*, *7*(4), 1368–1377. https://doi.org/10.31949/educatio.v7i4.1366

Hidayah, R., Fajaroh, F., & Narestifuri, R. (2021). Development of the collaborative problem-based learning model in chemistry education at universities. *Qalamuna-Jurnal Pendidikan, Sosial, Dan Agama*, *13*(2), 503–520. https://doi.org/10.37680/qalamuna.v13i2.1016

Hudiananingsih, D. (2019). *Effectiveness of Project-Based Learning (PjBL)*. *354*(iCASTSS), 378–382.

Imbaquingo, A., & Cárdenas, J. (2023). education sciences Project-Based Learning as a Methodology to Improve Reading and Comprehension Skills in the English Language. *Education Science*, *13*(587), 1–19.

Ismael, N., Jalinus, R., & Rahmat, P. (2024). Implementation of Project-Based Learning Computational Thinking Models in Mobile Programming Courses. *International JOurnal of Interactive Mobile Technologies*, *18*(11), 108–120.

Jamna, N., Hamid, H., & Bakar, T. (2022). Analysis of Middle School Students' Mathematical Computational Thinking Skills on Quadratic Equation Material. *Jurnal Pendidikan Guru Matematika*, *2*(3).

Juldial, H., & Haryadi, R. (2024). Jurnal basicedu. *Basicedu*, *8*(1), 136–144.

Kamil, R., Imami, A. I., & Abadi, A. P. (2021). Analysis of the mathematical computational thinking abilities of 9th-grade students at SMP Negeri 1 Cikampek on the topic of number patterns. *AKSIOMA: Jurnal Matematika Dan Pendidikan Matematika*, *12*(2), 259–270.

Kartikasari, Usodo, & Riyadi. (2022). The Effectiveness Open-Ended learning and Creative Problem-Solving Models to Teach Creative Thinking Skills. *Pegem Journal of Education and Instruction*, *12*(4), 29–38. https://doi.org/10.47750/pegegog.12.04.04

Koparan, T., & Güven, B. (2014). The Effect of Project Based Learning on the Statistical Literacy Levels of Student 8 th Grade. *EUROPEAN JOURNAL OF EDUCATIONAL RESEARCH*, *3*(3), 145–157. https://doi.org/10.12973/eu-jer.3.3.145

Kresnadi, H., Vilda, D., & Ghasya. (2023). Analysis of Computational Thinking Ability Based on the Stages of Pattern Generalization and Algorithm Design. *Jurnal Review Pendidikan Dan Pengajaran*, *6*(6), 1660–1666.

Kumala, F. N., Yasa, A. D., Bin, A., Jait, H., Wibawa, A. P., & Hidayah, L. (2023). *Patterns of Computational Thinking Skills for Elementary Prospectives Teacher in Science Learning: Gender Analysis Studies*. *7*(4), 646–656.

Kumala, F. N., Yasa, A. D., Salimi, M., Hakim, A. R., Azizah, N., & Nadhifa, C. (2025). Analysis of computational and critical thinking skills in elementary school science students. *Jurnal Bidang Pendidikan Dasar*, *9*(1), 59–68.

Kumala, F. N., Yasa, A. D., Salimi, M., Hidayah, L., & Chusniyah, D. (2024). Hybrid Learning Microsite Project STEAMER : Computational Thinking and Creative Thinking Abilities of Prospective Elementary School Teachers Proyecto de micrositio de aprendizaje híbrido STEAMER: pensamiento computacional y habilidades de pensamiento cre. *Data and Metadata*, *3*, 1–14. https://doi.org/10.56294/dm2024.591

Kumala, F. N., Yasa, A. D., Salimi, M., & Sueb. (2024). STEAMER Hybrid Learning Project for Creative and Computational Thinking : Perspectives from Elementary School Teacher Candidates. *International Journal of Educational Methodology*, *10*(3), 413–429.

Kumala, F. N., Yasa, A. D., Wibawa, A. P., & Hidayah, L. (2024). Application of the hybrid learning project STEAMER in science

courses for prospective elementary school teachers: Computational thinking and creative thinking. *Mutidisciplinary Scince Journal*, *6*, 1–12. https://doi.org/https://doi.org/10.31893/multiscience.2024113 Application

Lage-g, C., & Ros, G. (2024). On the interrelationships between diverse creativities in primary education STEAM projects. *Thinking Skills and Creativity Journal*, *51*(January), 1–16. https://doi.org/10.1016/j.tsc.2023.101456

Lapawi, N., & Husnin, H. (2016). The Effect of Computational Thinking Module on Achievement. *Science Education International*, *31*(2), 164–171.

Lely, M., Putra, Z., & Syahrilfuddin. (2020). Fifth Grade Students' Creative Thinking in Solving Open-Ended Mathematical Fifth Grade Students' Creative Thinking in Solving Open-Ended Mathematical Problems. *Journal of Teaching and Learning in Elementary Education (JTLEE)*, *3*(1), 58–68. https://doi.org/10.33578/jtlee.v3i1.7829

Lestari, S., & Roesdiana, L. (2023). *Analisis Kemampuan Berpikir Komputasional Matematis Siswa Pada Materi Program Linear*. *4*(2), 178–188.

Lestari, Z., Kurniady, K., Supian, & Rusmana, E. (2023). Implementar el aprendizaje basado en proyectos para mejorar las habilidades de lectura de los estudiantes en textos informativos. *JALL (Journal of Applied Lingusitics and Literacy)*, *7*(2).

Marchelin, L. E., Hamidah, D., & Resti, N. C. (2022). The effectiveness of the Scaffolding Method in Improving the Computational Thinking Skills of Junior High School Students on the Topic of Ratios. *Jurnal Pengembangan Pembelajaran Matematika*, *4*(1), 16–29. https://doi.org/10.14421/jppm.2022.41.16-29

Maria, S., & Puente, G. (2013). A sampled literature review of design-based learning approaches: A search for key characteristics. *International Journal of Technology and Design Education*, *June 2012*, 1–19. https://doi.org/10.1007/s10798-012-9212-x

Maryam, Kusmiyati, Merta, I. W., & Artayasa, I. P. (2019). The Influence of the Inquiry Learning Model on the Critical Thinking Skills of 11th Grade MIA Students at MAN 2 Mataram. *JURNAL Pijar MIPA*, *14*(3), 154–161. http://jurnalfkip.unram.ac.id/index.php/JPM/article/view/106

McGregor, D. (2007). *Developing thinking, developing learning: A guide to thinking skills in education*.

Moeller, B. M., Cutler, K., Fiedler, D., & Weier, L. (2013). Visual Thinking Strategies = Creative and Critical Thinking. *Phi Delta Kappan*, *95*(3), 56–60.

Mou, T. (2024). The practice of visual storytelling in STEM: Influence of creative thinking training on design students ' creative self-efficacy and motivation. *Thinking Skills and Creativity*, *51*(November 2022), 101459. https://doi.org/10.1016/j.tsc.2023.101459

Mufidah, I. (2018). Computational Thinking Profile in Solving Bebras Tasks Viewed from Students' Mathematical Logical Intelligence. Universitas Islam Negeri Sunan Ampel Surabaya.

Muhdhar, M. H. I. Al, Faruq, M. K., Sari, M. S., Sumberartha, I. W., & Mardiyanti, L. (2021). The effectiveness of the project-based learning-based ethnobotany module of Karang Kitri towards critical thinking skills. *AIP Conference Proceedings*, *2330*(March). https://doi.org/10.1063/5.0043107

Nurbavliyev, O., Kaymak, S., Almas, A., & Abedi, M. O. (2020). The Effect Of Project-Based Learning On Students' Achievement In Mathematics. *International Young Scholar's Workshop*, *9*, 235–248.

Nurhopipah, A., Nugroho, I. A., & Suhaman, J. (2021). Project-Based Programming Learning to Develop Children's Computational Thinking Skills. *Jurnal Pengabdian Kepada Masyarakat*, *27*(1), 6. https://doi.org/10.24114/jpkm.v27i1.21291

OECD. (2003). *Literacy Skills for the World of Tomorrow – Further Results from PISA (2000).* Organisation for Economic Co-operation & Development & Unesco Institute for Statistics.

Oktyasari, M. D., Setiawan, D. A., & Iswahyudi, D. (2021). Implementation of the School Literacy Movement Program in Children's Language Skills during the Covid-19 Pandemic (Case Study at SD Anak Saleh in Grade V). *Seminar Nasional PGSD UNIKAMA*, *5*(November), 117–128.

Padmadewi, N., Ratminingsih, N. M., & Utami, I. G. A. L. P. (2023). The Implementation of Literacy Activities in Primary School. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *7*(1), 150–156.

Pei, C., Weintrop, D., & Wilensky, U. (2018). Cultivating Computational Thinking Practices and Mathematical Habits of Mind in Lattice Land. *Mathematical Thinking and Learning*, *20*(1), 75–89.

Perković, L., Settle, A., Hwang, S., & Jones, J. (2010). A framework for computational thinking across the curriculum. *ITiCSE'10 - Proceedings of the 2010 ACM SIGCSE Annual Conference on Innovation and Technology in Computer Science Education*, 123–127. https://doi.org/10.1145/1822090.1822126

Prihatin, R., Wiyanarti, E., & Kurniawati, Y. (2021). The Analysis of Students' Creative Thinking Skills through the Implementation of the Project Based Learning Model in Social Studies Learning. *International Journal Pedagogy of Social Studies*, *6*(2), 9–14.

Purba, E. N., Surya, E., Syahputra, E., & Masalah, P. (2018). Analysis of Students' Creative Thinking Skills Through Problem Solving on the Topics of GCD and LCM. *Jurnal Pendidikan Matematika*, *5*(20).

Purwanti, Sunarno, W., & Sukarmin. (2022). The Learning of Respiratory System: Improving Students' Creative Thinking Skills Through Project-Based Learning. *INKUIRI: Jurnal Pendidikan IPA*, *11*(2), 118–127. https://doi.org/10.20961/inkuiri.vx.ix.xxxx

Purwanti, S., Astuti, R., Jaja, J., & Rakhmayudhi, R. (2022). Application of the Multimedia Development Life Cycle (MDLC) Methodology to Build a Multimedia-Based Learning System. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *5*(1), 2498–2506.

Rahayu, R., Lyesmaya, D., & Maula, L. (2023). Analysis of elementary school students' computational thinking skills based on Task-based Learning. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *08*(1), 219–234.

Safitri, T., Ginting, T., & Indriani, W. (2024). Analysis of Students' Mathematical Computational Thinking Skills in Mathematics Learning. *Bilangan : Jurnal Ilmiah Matematika, Kebumian Dan Angkasa*, *2*(2), 10–16.

Santrock, J. W. (2011). *Educational Psychology*. Mc.Graw Hill Education.

Sarwanto, Fajari, L., & Chumdari. (2021). Open-Ended Questions to Assess Critical-Thinking Skills in Indonesian. *International Journal of Instruction*, *14*(1), 615–630.

Selby, C. (2013). Computational Thinking: The Developing Definition. *ITiCSE Conference 2013*, 5–8.

Setiawan, D. A., Kumala, F. N., & Tamaella. (2023). Literacy-based tex books to improve the character and language competence of elementary students. *Jurnal Bidang Pendidikan Dasar*, *7*(1), 83–91.

Shin, N., Bowers, J., Krajcik, J., & Damelin, D. (2021). Promoting computational thinking through project-based learning. *Disciplinary and Interdisciplinary Science Education Research*, *3*(1). https://doi.org/10.1186/s43031-021-00033-y

Sternberg, R. J. (2003). Creative thinking in the classroom. *International Journal of Phytoremediation*, *47*(3), 325–338.

https://doi.org/10.1080/00313830308595
Wang, H., & Wang, C. A. (2024). Acta Psychologica Teaching design students machine learning to enhance motivation for learning computational thinking skills. *Acta Psychologica*, *251*(August), 104619. https://doi.org/10.1016/j.actpsy.2024.104619
Weisberg, R. W. (2006). *Creativity: Understanding innovation in problem solving, science, invention, and the arts:* John Wiley & Sons.
Wing, J. (2006). computational Thinking. In *Concurrences* (Vol. 49, Issue 3, pp. 33–35).
Wing, J. M. (2017). Computational thinking's influence on research and education for all Influenza del pensiero computazionale nella ricerca e nell'educazione per tutti. *Italian Journal of Educational Technology*, *25*(2), 7–14. https://doi.org/10.17471/2499-4324/922
Yadav, A., Zhou, N., Mayfield, C., Hambrusch, S., & Korb, J. T. (2011). Introducing computational thinking in education courses. *SIGCSE'11 - Proceedings of the 42nd ACM Technical Symposium on Computer Science Education*, 465–470. https://doi.org/10.1145/1953163.1953297
Yasa, A. D., Kumala, F. N., Wibawa, A. P., & Hidayah, L. (2023). *Evaluation of Creative Thinking Skills in the Development of Elementary Science Learning in Elementary Schools: A Mix Method Study*. *7*(4), 559–568.
Yu, H. (2024). Enhancing creative cognition through project-based learning: An in-depth scholarly exploration. *Heliyon*, *10*(6), e27706. https://doi.org/10.1016/j.heliyon.2024.e27706
Yulvinamaesari, & Tenriawaru, E. P. (2017). Analysis of the Creative Thinking Ability of Physics Students in Terms of Differences in Multiple Intelligence. *Jurnal Dinamika*, *8*(1), 1–15.
Yuniarti, Y., Kusumah, Y. S., Suryadi, D., & Bana, G. (n.d.). The Effectiveness of Open-Ended Problems Based Analytic-Synthetic Learning on the Mathematical Creative Thinking Ability of Pre-Service Elementary School Teachers. *INTERNATIONAL ELECTRONIC JOURNAL OF MATHEMATICS EDUCATION*, *12*(3), 655–666.
Yuntawati, Y., Sanapiah, S., & Aziz, L. A. (2021). Analysis of Students' Computational Thinking Abilities in Solving Mathematical Problems. *Media Pendidikan Matematika*, *9*(1), 34. https://doi.org/10.33394/mpm.v9i1.3898
Yustina, Mahadi, I., Ariska, D., Arnentis, & Darmadi. (2022). The Effect of E-Learning Based on the Problem-Based Learning Model on Students' Creative Thinking Skills During the Covid-19 Pandemic. *International Journal of Instruction*, *15*(2), 329–348.
Zhang, W., Guan, Y., & Hu, Z. (2024). The efficacy of project - based learning in enhancing computational thinking among students: A meta - analysis of 31 experiments and quasi - experiments. *Education and Information Technologies*, *29*(11), 14513–14545. https://doi.org/10.1007/s10639-023-12392-2
Zia, S., & Hasanah, H. (2024). Systematic Literature Review: Analysis of Elementary School Students' Computational Thinking Skills Using Scratch. *PENDEKAR: Jurnal Pendidikan Berkarakter Vol.*, *2*(3).