



Development of a Project-Based Learning Model Assisted by the Interactive Canva Application to Improve Creative Thinking and Collaboration Skills of Fourth Grade Elementary School Students

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Abstract

This study aims to develop a Project-Based Learning (PjBL) model assisted by the interactive Canva application to improve the creative thinking skills and collaboration skills of fourth-grade elementary school students. This study uses the Research and Development (R&D) method with reference to the Borg & Gall development model. The research stages consist of a preliminary study stage, a limited trial, a main field trial, and an operational field trial. The research subjects involved 140 fourth-grade elementary school students in Purwakarta Regency. The instruments used were interview guidelines, observation sheets, questionnaires, and creative thinking ability tests. Data analysis was carried out qualitatively and quantitatively with the help of SPSS software. The Wilcoxon non-parametric test was applied because the data distribution was not normal. The results of the study indicate that the developed learning model is declared very valid based on expert assessment. The trial results show that the PjBL model assisted by interactive Canva received positive to very positive responses from students. In addition, the effectiveness of the learning model is demonstrated by the increase in students' creative thinking skills with N-gain values in the high category. Students' collaboration skills also increased and are in the effective category. Thus, the PjBL model assisted by the interactive Canva application is feasible and effective for use in learning to improve the creative thinking skills and collaboration skills of fourth grade elementary school students.

Keywords: Collaboration Skills; Creative Thinking Skills; Interactive Canva Application; Project-Based Learning Model

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INTRODUCTION

Currently, education in Indonesia has undergone developments. This development demands education that can produce a generation with 21st-century skills and abilities. Therefore, one of the goals of education is to produce quality graduates (Lecturer Team of the Department of Educational Administration, 2005), in this case, graduates who have relevant knowledge and skills as well as positive characters for the advancement of the nation. In realizing this, schools must be able to explore

and develop human cultural products (Wulandari, 2016) referring to the existing curriculum in every learning practice that is programmed in instructional design, to make students learn actively, which emphasizes the provision of learning resources (Dimiyati & Mudjiono, 2015).

Indonesia is currently implementing the "Merdeka Curriculum" (independent curriculum). This curriculum focuses on essential content. Students are required to explore material and knowledge from other sources. The information they obtain can be processed and used as a reference to create new ideas or works. In other words, students are encouraged to think creatively.

Creative thinking is one of the higher-order thinking skills. Guilford defines creative thinking as the ability to see multiple possible solutions to a problem (Sukmawijaya et al., 2019). This means that creative thinking is the ability to see various opportunities and synthesize various information to form new ideas that can be used to solve problems. Students need to explore their creative potential to address various contextual problems, which require reasoning, argumentation, and creative thinking skills (Sukmawijaya et al., 2019). Recognizing the importance of creative thinking skills, teachers must develop learning designs that can help students improve their creative thinking skills as part of their higher-order thinking skills in learning.

In the learning process, creative thinking also requires collaboration skills. According to Hurlock, the ability to collaborate is a key component of social behavior (Dewi et al., 2018). The more opportunities children have to work together and complete tasks, the more quickly they learn to work collaboratively (Dewi et al., 2018). Through collaborative skills, students are expected to develop a wider variety of new ideas and concepts as a result of discussions with their peers.

However, in practice, students' creative thinking and collaboration skills are still relatively low. This is based on pre-research interviews conducted at an elementary school in Purwakarta Regency, which revealed that students' creative thinking skills are still relatively low. This is due to students simply copying answers without engaging in creative thinking when answering questions. This statement is evidenced by the lack of motivation to learn, a low awareness of developing knowledge, and poor communication skills during discussions. These factors significantly impact student learning outcomes. Therefore, the better students' collaboration skills, the more ideas they will have, and the better their creative thinking skills, as demonstrated by their learning outcomes.

Based on the analysis of the problems and underlying causes above, an appropriate solution is needed to achieve students' creative thinking and collaboration skills, namely the use of an appropriate learning model. The use of an appropriate learning model will further optimize student learning outcomes (Purnamasari & Sadewo, 2020). Therefore, a teacher must possess the knowledge, skills, and abilities to apply appropriate learning methodologies and approaches (MKDK Curriculum and Learning Development Team, 2002).

Given the importance of students' creative thinking and collaboration skills, researchers have attempted to implement different learning models. One learning model that can be used is one that emphasizes student-centered learning and develops meaningful student learning experiences. One learning model thought to enhance students' creative thinking and collaboration skills is PjBL model.

PjBL is a learning model that emphasizes project-based learning or real-life assignments, allowing students to learn through direct experience and the application of learned concepts in real-life contexts. PjBL is an innovative learning model that encourages students to conduct investigations, work collaboratively in research, and create projects that apply their knowledge from discovering new things, becoming proficient in using technology, and being able to solve problems (Adina et al., 2021). With the PjBL model, students can think about creating a project or work during learning and are directly involved during the learning process (Marlani & Prawiyogi, 2019). However, in its implementation, PjBL often faces several obstacles, such as limited resources, a lack of interactive learning media, and a lack of student collaboration in managing learning projects. Therefore, the development of the PjBL model requires support from interactive media.

Media is an integral part of learning. It not only serves as a learning aid but also as a complementary component. Furthermore, the use of media can increase students' desire to learn. The interactive media in question is the Canva interactive application. Learning with Canva can be said to

be practical and impact students' ability to understand concepts (Bakara et al., 2023). This is because the application offers engaging visual, audio, and video learning designs. Therefore, Canva is considered a solution for improving students' creative thinking and collaboration skills in fourth-grade elementary school learning. However, in reality, teachers still rarely utilize digital tools in the learning process. Teachers only focus on textbooks during the delivery process. This makes learning less varied and enjoyable.

Based on the explanation above, the researcher is interested in developing a learning model using interactive media. Therefore, the focus of this research is "Developing a Project-Based Learning Model Assisted by the Canva Interactive Application to Improve Creative Thinking and Collaboration Skills in Fourth-Grade Elementary School Students." The objectives of this study are to analyze: (1) the process of developing a PjBL model assisted by the Canva interactive application to improve creative thinking and collaboration skills in fourth-grade elementary school students; (2) The feasibility of the PjBL model assisted by the interactive Canva application to improve the creative thinking skills and collaboration skills of fourth grade elementary school students; and (3) The effectiveness of the PjBL model assisted by the interactive Canva application in improving the creative thinking skills and collaboration skills of fourth grade elementary school students.

RESEARCH METHODS

Research Design

The research method used was Research and Development (R&D), often referred to as R&D. Research and Development (R&D) is a research method for developing and testing products that will later be developed in education (Amali et al., 2019). R&D in education is the process used to develop and validate educational products (Slamet, 2022). This method was chosen based on its characteristics, as the research involves developing an educational product. Therefore, the research aimed to develop a PjBL model.

The design used was the Borg & Gall development model. The research stages are as follows:

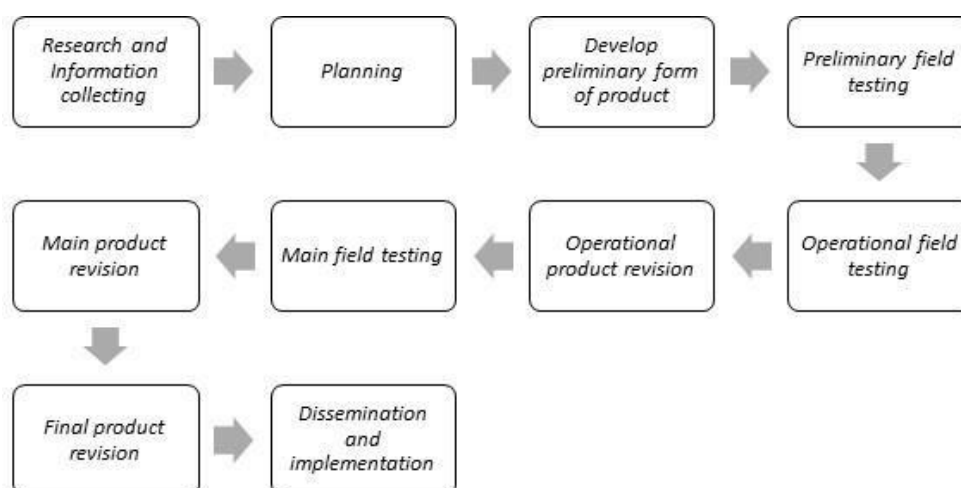


Figure 1. Research and Development (R&D) Design Model Borg & Gall (Slamet, 2022)

Research Subject

The subjects of this study were 1 class with 27 students in the preliminary study stage, 1 class with 37 students in the limited trial stage, and 2 classes with 34 and 42 students in the broad trial and effectiveness stage. The researcher took a sample of 140 using the Lemeshow formula with SPSS and obtained a sample of at least 97 students or around 4 classes that would be the research subjects.

Research Procedure

The research procedure used in this study adopts the research and development stages (Borg & Gall, 1983). The research stages will follow the Borg & Gall development model, which the researchers summarized as three main stages: (1) Planning and development; (2) Testing and revision; and (3) Publication.

The planning and development stage is the initial stage in this research. The following steps are carried out: (1) Research and information collection to obtain data on field needs regarding creative and collaborative learning; (2) Planning or designing a PjBL model product using the interactive Canva application by formulating skills and expertise related to the problem, identifying and defining skills, determining objectives to be achieved at each stage, and, if possible/necessary, conducting a limited feasibility study (Hamdani, 2011; Slamet, 2022). and (3) Developing a Preliminary Form of Product, or developing the type/form of the initial product, includes preparing supporting components, learning materials, compiling a manual, and evaluation tools (Hamdani, 2011; Slamet, 2022).

The next stage is the testing and revision stage. At this stage, researchers conduct: (1) Preliminary Field Testing, or trialing the product that has been previously developed and revised on a limited scale, involving 6-12 subjects (Hamdani, 2011) or 1-3 schools using 6-12 subjects (Slamet, 2022) through interviews, observations, or questionnaires in data collection and analysis. (2) Main Product Revision or revision (improvement) of the product that has been tested based on input and suggestions from the initial test results (Hamdani, 2011; Slamet, 202) which may be done more than once, according to the results shown in the limited trial, so that a draft of the main product (model) is obtained that is ready for wider trials; (3) Main Field Testing or main trials involving all students (Hamdani, 2011) or 5-15 schools, with 30-100 subjects (Slamet, 2022) through interviews, observations, and questionnaires. (4) Operational Product Revision or improvements/improvements to the results of wider trials, so that the product developed is an operational model design that is ready to be validated based on input and suggestions from the results of the main field test (Hamdani, 2011; Slamet, 2022); (5) Operational Field Testing, or final trial testing after the product has been revised in 10-30 schools with 40-200 subjects (Slamet, 2022) through interviews, observations, and questionnaires; and (6) Final Product Revision, or final revision of the product that has been tested in the operational field trial stage (Slamet, 2022).

The final stage is the publication stage. At this stage, researchers conduct Dissemination and Implementation, or dissemination and implementation of the validated product by disseminating the developed product/model and applying it in the field (Hamdani, 2011). Meanwhile, according to Borg and Gall, at this stage, researchers disseminate and implement the product, report and disseminate the product through meetings and scientific journals, and collaborate with publishers for socialization (Slamet, 2022).

Instruments, and Data Collection Techniques

The data required for this study are: (1) data on the analysis of the objective conditions of science learning; (2) data on students' creative thinking and collaboration skills; (3) data on the PjBL model development design using the interactive Canva application; and (4) data on the effectiveness evaluation of the PjBL model using the interactive Canva application. Collecting this data requires a tool or instrument (Hartono, 2011) to facilitate the work and improve the results, meaning that it is more accurate, complete, and systematic, making it easier to process (Arikunto, 2006). The researcher used two types of instruments: non-test and test.

The non-test instruments used in this study were: (1) Interview guidelines used for dialogue between the researcher (interviewer) and the teacher as the source (interviewee) to obtain qualitative data information (Hartono, 2011) regarding the initial conditions of the sample class, descriptions of students' initial creative thinking skills, students' collaboration skills, the learning process typically carried out by teachers in the classroom, and learning needs to create creative learning and encourage collaboration; (2) Documentation or research instruments that use written materials as data sources, for example books, magazines, documents, journals, regulations, and others (Hartono, 2011) or data

in the form of notes, transcripts, books, newspapers, magazines, inscriptions, meeting minutes, ledgers, agendas, and so on (Arikunto, 2009) to obtain the necessary data related to the number of students, student assessment data, learning outcomes, teaching modules, and photos of research activities; (3) Observation sheets used in observing ongoing activities (Syaodih, 2009) such as teacher and student activities, student presentations, products produced, and students' collaboration skills during group discussions in working on projects aimed at obtaining qualitative data on the application of the interactive Canva-assisted PjBL model in science learning in accordance with the planning in the teaching modules that have been made previously. The observation sheet for students' collaboration skills refers to Greenstein's collaboration indicators: communication, expressing opinions, working productively, compromising, managing projects effectively, and being responsible (Nurmala & Priantari, 2017); (4) A questionnaire or data collection technique involves administering a structured, closed-ended questionnaire containing written questions that provide potential answers that must be selected using a rating scale to obtain information from respondents about their experiences and knowledge (Hatimah et al., 2007; Wibawa et al., 2022). This questionnaire was used to obtain data on the learning process, which implemented the PjBL model using the interactive Canva application, carried out by the teacher, as well as student self-reflection during the learning process. The criteria for student responses are: $x < 1.00$ is very unfavorable, $1.00 \leq x < 2.00$ is unfavorable, $2.00 \leq x < 3.00$ is considered moderately positive, $3.00 \leq x < 3.50$ is considered positive, and $x \geq 3.50$ is considered very positive.

In addition to non-test instruments, researchers also developed test instruments. Tests are a series of questions or exercises used to measure the knowledge, abilities, talents, intelligence, and skills of individuals or groups (Arikunto, 2006; Hartono, 2011). This test instrument consists of several questions. These questions are used to measure creative thinking skills with indicators of fluent thinking, flexible thinking, original thinking, and elaboration skills through pretests and posttests. The pretest is used to determine students' initial abilities before the treatment is administered. The posttest is used to determine students' final abilities after the treatment.

After the researchers developed the research instruments, they conducted a feasibility test or instrument validation. This step included questionnaires designed for subject matter experts, model experts, and media experts to validate the product designs. Subject matter experts are experts in and knowledgeable about science, model experts are experts in and knowledgeable about the PjBL model, and media experts are experts and competent in creating media/teaching tools, one of which is the use of interactive Canva.

Empirical validity and reliability tests were conducted on fifth-grade students. The test results showed that all five test questions had a significance value < 0.05 , thus all five were declared valid. Meanwhile, the questionnaire instrument results showed that there were three invalid statements: statements 3, 7, and 10. Because there were three invalid questions, the researchers conducted a theoretical validity test with an expert. The results showed that all test instruments received an average score > 3.00 (very valid) and were declared valid by the expert. In addition, the results of the reliability test showed that the Cronbach's Alpha value on the test question instrument was $0.615 > 0.6$, which means the instrument is reliable. Meanwhile, the results on the questionnaire instrument showed that the Cronbach's Alpha value on the questionnaire instrument was $0.654 > 0.6$, which means the instrument is also reliable.

Data Analysis Technique

Data analysis in this study consisted of qualitative and quantitative data analysis. Qualitative data analysis was used to process data regarding the objectivity of science learning among fourth-grade elementary school students in Purwakarta Regency, obtained through interviews and observations. Furthermore, qualitative data analysis was used to process data on the feasibility of the Canva-assisted interactive PjBL model obtained during the product validation stage. Qualitative data analysis was conducted descriptively and interpretively, including organizing and breaking down the data into units, synthesizing, arranging them into patterns, determining relationships between parts,

and drawing logical and systematic conclusions.

Quantitative analysis was used to analyze the effectiveness of the Canva-assisted interactive PjBL model on the creative thinking and collaboration skills of fourth-grade elementary school students based on the results of the pretest and posttest of creative thinking skills. Quantitative data analysis was conducted as follows: if the pretest and posttest scores were normally distributed, the hypothesis test used a t-test. If the data is not normally distributed, the non-parametric Wilcoxon signed-rank test is used. All these tests were processed using SPSS version 25 at a significance level of 0.05.

RESULTS AND DISCUSSION

Designing a PjBL Model Using the Interactive Canva Application

The process of designing a Project-Based Learning (PjBL) model supported by the interactive Canva application was grounded in a systematic and evidence-based development framework. Before formulating the model structure, learning syntax, and media integration strategy, it was essential to conduct a comprehensive needs analysis.

1. Needs analysis

In designing and developing a model, a researcher must first analyze the needs for that model. At this stage, an analysis of the objective conditions of science and science learning in fourth-grade elementary school is conducted. This analysis aims to obtain a realistic picture of the learning process, student characteristics, and the state of students' creative thinking and collaboration skills before implementing the PjBL model supported by the interactive Canva application.

Based on initial observations and interviews with classroom teachers, science and science learning is still dominated by conventional, teacher-centered methods. Learning activities tend to be one-way, with the teacher delivering material and students passively receiving information. This situation results in low student participation in the learning process, particularly in discussions and problem-solving activities. Based on the analysis of student needs in discussing science and science learning materials, data showed that most students lacked effective collaboration. This was evident in the lack of clear division of tasks, minimal communication between students, and low individual accountability within groups. These findings indicate a problem in the implementation of science and science learning in fourth-grade elementary school. Only a small proportion of students actively participated in science and science learning according to their group assignments, necessitating a more effective approach to increasing student participation in science and science learning. In other words, students' collaborative skills in group learning are still suboptimal.

Furthermore, data also showed that most students lack the ability to think creatively in science lessons. Students' creative thinking skills at baseline indicated that they were not yet accustomed to expressing diverse and original ideas. Most students simply followed the teacher's examples without developing their own ideas. This indicates a need to develop more effective teaching materials and student worksheets (LKPD) tailored to students' needs to ensure a thorough understanding of the material. These initial findings provide an important basis for researchers to develop learning models that encourage active student involvement, stimulate creativity, and enhance collaboration skills through project-based learning supported by interactive media. Therefore, the results of this needs analysis will serve as guidelines for developing development products that can enhance student collaboration in science lessons and foster strong creative thinking skills regarding plant parts and their functions.

Based on the research findings above, learning is still teacher-centered, resulting in passive student activity. Low student participation in conventional learning is characterized by a lack of enthusiasm, minimal interaction, and high dependence on the teacher (Imansyah & Silviana, 2025). Students simply receive information without much involvement in discussions or problem-solving,

which hinders the development of higher-order thinking skills. In 21st-century learning, particularly in the independent curriculum, which implements a deep learning approach, teacher-centered learning is no longer relevant and effective. This is because such learning fails to develop 21st-century skills, particularly creative thinking and collaboration. Findings of low student participation indicate the continued dominance of the teacher-centered approach, which, according to constructivist theory, fails to facilitate the active construction of knowledge, thus hindering the development of higher-order thinking skills (Imansyah & Silviana, 2025).

Furthermore, findings regarding students' still-low collaboration skills are evident in the lack of communication among group members, unequal distribution of tasks, and suboptimal individual accountability. Low student collaboration is also characterized by students unwilling to accept the burden of other students' responsibilities, being less active and contributing less during class discussions, and lacking motivation to learn (Mu'arifah et al., 2023). In fact, the ability to collaborate is a very important social skill to possess and develop, and it will be useful in real life and the future workplace. In constructivist theory, Vygotsky also explains that knowledge is constructed through social interaction (Hidayat, 2025). In other words, students' low cooperative skills indicate suboptimal social-constructivist learning, even though social interaction is a key mechanism for building stronger conceptual understanding.

On the other hand, students' creative thinking skills are also still low. This is despite the fact that human resources are currently required to be proficient in higher-order thinking, one of which is the ability to think creatively (Mardhiyana & Sejati, 2016). Students tend to imitate examples given by teachers without developing ideas independently. Creative thinking is the ability to analyze new information, provide varied responses to problem-solving, and combine unique ideas or concepts to solve problems (Dewi et al., 2019; Moma, 2015). In other words, research findings indicate that students' creative thinking skills are still suboptimal.

Considering that science learning encompasses objects, theories, concepts, and investigations of natural phenomena or discovery processes (Wibowo & Suhandi, 2013), students are required to interpret lesson content and be able to solve environmental problems. Students require creative thinking skills to study and understand these objects or natural phenomena (Anjarsari, 2014). Therefore, teachers need to optimize students' creative thinking abilities in science learning (Dewi et al., 2019). These findings indicate the need for a learning model capable of increasing active student engagement, developing creativity, and fostering collaboration skills. Learning must stimulate active student participation to foster creativity (Kurniati et al., 2018), as high creativity indicates a person's ability to think creatively (Mulyaningsih & Ratu, 2018).

Based on this, the development of a PjBL model using the interactive Canva application is seen as a relevant solution to address these issues. The PjBL model provides contextual learning experiences through the presentation of real-life problems and the creation of problem-solving projects, encouraging students to think creatively and collaborate. PjBL aligns with John Dewey's view that hands-on experience is the foundation of meaningful learning, as students construct concepts through investigations into real-life problems (Zuhriyah et al., 2025). Meanwhile, the use of the interactive Canva application serves as a visual medium capable of increasing student motivation and engagement in learning. Canva's integration supports Mayer's multimedia theory, which states that the combination of visual and verbal representations can enhance information processing and improve students' conceptual understanding (Taufiq et al., 2025). These findings reinforce the idea that integrating innovative learning models and digital media can improve the quality of the learning process.

2. Design

The development of the interactive Canva-assisted PjBL model was conducted through R&D stages, referring to the Borg & Gall model. The resulting product is a learning model equipped with supporting tools, such as learning syntax, teaching modules, a Canva user guide, and assessment instruments for students' creative thinking and collaboration skills. The developed PjBL model

consists of six main stages: (1) defining the fundamental question, (2) designing the project plan, (3) developing an implementation schedule, (4) monitoring project activities and progress, (5) testing project results, and (6) evaluating the learning experience. Each stage is designed to provide students with opportunities to develop creative ideas, work collaboratively, and produce meaningful learning products.

The interactive Canva application is used as a supporting medium in the project creation and presentation process. Using Canva makes it easy for students to design engaging visual products, while simultaneously practicing creative thinking and collaboration skills through the available teamwork features. For more details, the following is an explanation of the learning tools. The developed teaching module contains learning materials consisting of learning objectives, learning materials, learning activities, and learning evaluations. The teaching module aims to facilitate students' creative thinking skills on plant parts and their functions using the interactive Canva platform and to enhance student collaboration.

The teaching module is designed to guide teachers in implementing the development of the Canva interactive PjBL model to enhance the creative thinking and collaboration skills of fourth-grade elementary school students. The teaching module includes learning activities consisting of an introduction, main body, and conclusion, as well as time allocation and necessary learning resources. In developing the teaching module, the researcher referred to the competency standards and basic competencies established in the Merdeka Curriculum. Furthermore, the researcher also considered the characteristics of fourth-grade elementary school students in Purwakarta Regency, who have varying abilities in understanding the learning material. In this regard, the researcher strives to address student needs and adapt appropriate learning strategies to enhance students' creative thinking and collaboration skills. By developing a well-designed teaching module, teachers can effectively implement the Canva interactive PjBL model to enhance the creative thinking and collaboration skills of fourth-grade elementary school students, enabling them to achieve optimal learning outcomes.

Furthermore, the researcher also designed student worksheets (LKPD). The student worksheets in the PjBL model development teaching module assisted by the interactive Canva application to improve the creative thinking skills and collaboration skills of fourth grade elementary school students contain practical steps that must be carried out by students independently or in groups to achieve learning objectives. The following are some examples of activities that can be included in the student worksheets in this teaching module: (1) Observing plant parts; (2) Collecting information; (3) Given a case or problem; (4) Determining goals and objectives; (5) Determining a project plan; (6) Taking action; and (7) Evaluation. This student worksheet will help students understand the steps they must take in the project, as well as provide them with an opportunity to reflect on what they have learned and achieved.

The evaluation tools used in the development of the Canva interactive PjBL model to improve the creative thinking and collaboration skills of fourth-grade elementary school students include process evaluation and outcome evaluation. Process evaluation is used throughout the classroom learning process. This evaluation occurs while students participate in activities such as discussions, student worksheet implementation, collaboration, and group presentations. The process evaluation is conducted by researchers using a student activity observation format. The outcome evaluation is conducted to determine students' creative thinking skills regarding the material on plant parts and their functions presented in the Canva interactive PjBL model and to evaluate students' ability to produce products. The outcome evaluation is conducted after all learning activities have been completed and the products have been produced.

The process evaluation is conducted using a student activity observation format that covers several aspects such as student engagement in activities, student activeness in discussions, collaboration among students, and student ability to present group work results. This evaluation aims to assess the extent to which students are actively involved in learning and improve their collaboration, interpersonal, and presentation skills. The outcome evaluation is conducted through written tests and assessments of student products created during the learning process. A written test was conducted to

determine students' creative thinking skills regarding the material on plant parts and their functions presented in the interactive Canva application-assisted PjBL model. Meanwhile, student product assessment was conducted to evaluate students' ability to produce products and apply the concepts learned in the lesson.

In the outcome evaluation, student products were assessed using an assessment rubric covering several aspects such as design and appearance, function and performance, innovation and creativity, and presentation skills. The written test, meanwhile, used essay questions. By using the evaluation tools, consisting of process evaluation and outcome evaluation as mentioned above, researchers hoped to evaluate the effectiveness of the Canva Interactive PjBL Model in improving creative thinking and collaboration skills in fourth-grade elementary school students.

Based on the research findings, the learning model was developed using a Research and Development approach, referring to the Borg & Gall model. The developed PjBL model consists of six stages: (1) Determining the fundamental question; (2) Designing the project plan; (3) Developing a project implementation schedule; (4) Monitoring project activities; (5) Testing project results. and (6) Evaluation of learning experiences (Badaring, 2021). The fundamental question-setting stage plays a crucial role in stimulating students' curiosity. Presenting contextual problems through interactive Canva media provides an engaging visual experience, making it easier for students to understand the fundamental questions posed. Visual media has been shown to enhance conceptual understanding because it combines text, images, animation, and engaging colors. This aligns with Mayer's multimedia learning theory, which argues that learning that combines text, images, and visual elements can strengthen conceptual understanding and improve student retention (Taufiq et al., 2025).

The stages of designing a project plan and developing a project implementation schedule allow students to work together in groups. Vygotsky's constructivist theory holds that knowledge is built through collaboration between individuals (Hidayat, 2025). This means that students can actively interact in the discussion process to design a project plan and develop a project implementation schedule. During this stage, the teacher acts solely as a facilitator, guiding students to divide tasks according to their individual abilities.

The stages of monitoring project activities and testing project results provide opportunities for students to develop their creativity through project creation activities. These activities encourage students to construct knowledge independently, making learning more contextual and meaningful. Furthermore, students are also required to test their projects, requiring them to experiment to create projects that solve the problems presented in the initial stages. John Dewey stated that the concrete activities students engage in during investigations enable them to solve problems, think critically, and experiment because they foster reflection, analysis, and in-depth conceptual understanding (Zuhriyah et al., 2025). The evaluation stage of the learning experience trains students in communication skills when providing feedback on their peers' projects. Through this activity, students learn to express ideas systematically and structuredly and receive input from other groups. The evaluation phase also helps students reflect on the learning process, thereby enhancing metacognitive awareness. This is in line with John Dewey's view that school is not only a place for transferring knowledge but also for practicing cooperation, communication, and social responsibility (Zuhriyah et al., 2025). Therefore, the PjBL model designed using the interactive Canva application focuses not only on achieving cognitive learning outcomes but also on developing social skills such as cooperation and communication, as well as students' creative thinking abilities.

These stages are systematically designed to encourage students to actively engage in learning with the aim of improving creative thinking and collaboration skills. Creative thinking is a form of cognitive thinking (Yuliani, 2017). Creative thinking is demonstrated by fluent thinking, flexible thinking, original thinking, and elaborative skills (Munandar, 2012). Fluent thinking can be seen when students are able to ask questions, are adept at conveying ideas, and have the ability to think quickly (Febrianti et al., 2016). Flexible thinking can be seen when students can provide varied ideas and answers (Fajriah & Asiskawati, 2015). Original thinking can be seen when students can solve problems in their own way (Samura, 2019). Meanwhile, elaboration skills can be seen when students

answer questions in detail and can expand on ideas (Febrianti, et al., 2016). This shows that creative thinking is also an important competency in modern education because it helps students solve problems in their own way. Therefore, the design of this learning model is designed to help students hone their creative thinking skills.

3. Eligibility

Following the explanation of the model development process, model feasibility was also discussed, including validation by subject matter experts and media experts. Validation results are used as the basis for revising the product before testing it with students. To ensure the feasibility of a developed model, researchers must first validate the product. Model feasibility testing is conducted through validation by subject matter experts, learning model experts, and education practitioners. Aspects assessed include the model's suitability to learning objectives, clarity of syntax, the suitability of the interactive Canva media, and the suitability of the assessment instruments to indicators of creative thinking and collaboration skills. Validation of the teaching module is conducted to ensure that the teaching module meets curriculum standards and is easily understood by students. This validation can be done by seeking input from curriculum experts or teachers with experience teaching the same material.

Validation of the Student Worksheet (LKPD) is conducted to ensure that the LKPD that has been created aligns with the material being taught and can help students understand it. This validation can be done by giving the LKPD to several students or teachers with experience teaching the same material and asking them to provide input regarding the content and the LKPD's suitability to the material being taught. Validation of the interactive Canva media was conducted to ensure that the interactive Canva aligns with the concept and information intended to be conveyed to students. This validation can be conducted by seeking input from experts in the field of learning media or technology who can provide input regarding the details and suitability of the interactive Canva to the intended concept. In general, the validation results indicate that the interactive Canva-assisted PjBL model is deemed suitable for use in science learning in fourth-grade elementary school. Several inputs and suggestions from the validators were used as the basis for revising and refining the model before wider testing.

Table 1 presents the results of the expert assessment of the initial product of the interactive Canva-assisted PjBL model to improve creative thinking and collaboration skills in fourth-grade elementary school students.

Table 1. Instrument Device Validation Results

No	Validated Aspects	Average Score	Description
1	PjBL Model Design	3.91	Very valid
2	PjBL Model Development	3.83	Very valid
3	Teaching Module	3.90	Very valid
4	Teaching Materials	3.84	Very valid
5	Learning Media	3.89	Very valid
6	Student Worksheets	3.87	Very valid
7	Creative Thinking Ability Test Questions	3.70	Very valid

Based on Table 1, all seven validation results are considered good and can be used. However, the test item validation results were the lowest among the others, and the average difference tended to be quite significant, requiring adjustments to the test items. For further clarification, here are expert recommendations and suggestions regarding the initial product.

Table 2. Recommendations and Suggestions from Experts in the Field of Research and Development

Recommendations	Suggestions
The product development of the PjBL learning model supported by the interactive Canva application is good and can be used in teaching.	Suggestions for future model development include enhancing innovative and creative aspects in the development of teaching modules, and enhancing the clarity of instructions in the Student Worksheets (LKPD). Furthermore, for better measurement, it would be beneficial to have at least two test questions for each indicator of creative thinking ability.

Based on the learning expert's comments, it appears that they responded positively to the initial product development, consisting of model books, teaching modules, student worksheets (LKPD), teaching materials, and interactive Canva media. Suggestions were given regarding the aesthetic elements of the teaching modules, the clarity of the instructions in the LKPD, and the number of questions for each indicator of creative thinking skills.

Based on the expert's assessment, several aspects of the initial product development needed improvement. Therefore, several revisions were made to enhance the product's quality. Revisions were made to the test questions, adding several questions. Furthermore, the set of teaching modules was also improved, focusing on aesthetics and clarity of instructions. After these revisions, the resulting product is expected to better meet the criteria and support the achievement of learning objectives, as well as enhance students' creative thinking and collaboration skills.

Based on the research findings, validation results indicated that all learning tools were categorized as highly valid. Several aspects assessed included the model's suitability to the learning objectives, clarity of learning syntax, appropriateness of Canva media use, and appropriateness of assessment instruments. This indicates that the developed learning tools met quality standards in terms of material, language, presentation, and media display. Validation of teaching modules ensures that the material presented aligns with the curriculum and student characteristics. A good module can help teachers manage learning systematically. Validation of the student worksheets (LKPD) shows that the designed worksheets can guide students in conducting investigations, solving problems, and developing projects. This demonstrates that the teaching modules and LKPD can provide students with interactive, real-world experiences through project-making activities, as well as meaningful contextual learning. This will undoubtedly impact the effectiveness of the learning process. Piaget emphasized that knowledge is built through activity, not passively transferred from teacher to student (Zuhriyah et al., 2025).

Validation of the interactive Canva media showed that the learning media has an attractive visual appearance, is easy to use, and aligns with learning objectives. Technology-based learning media has been proven to increase student motivation by providing a more enjoyable learning experience. This demonstrates that teachers are capable of creating digital-based learning media that can increase student participation in learning. This aligns with Mayer's statement that teachers are required to design learning experiences that creatively integrate technology to make learning meaningful (Taufiq et al., 2025).

Although the product was generally deemed highly valid, several improvements were suggested, such as increasing the innovation aspect of the teaching module and increasing the number of questions for each indicator of creative thinking skills. These revisions demonstrate that learning product development must be dynamic and oriented to student needs. In other words, the validation results indicate that the developed learning model is suitable for use in science learning with several revisions and improvements.

4. Limited Testing

After the product was revised, the researchers conducted an initial field trial. The initial field trial was conducted with one class of 27 students. The results of the student response questionnaire regarding the implementation of Canva-assisted interactive PjBL in science learning are as follows.

Table 3. Results of the Student Response Questionnaire in the Initial Field Trial

No	Aspect Assessed	Average Score	Description
1	What is your impression of the recent learning about plant parts using the PjBL model?	3.30	Positive
2	Did you find it difficult to follow the science learning activities using the PjBL model?	3.48	Positive
3	Was the teacher's explanation of science and the material on plant parts easy to understand?	3.19	Positive
4	Did the Canva media used help you understand the material more easily?	3.59	Very Positive
5	Are there any advantages to learning science using the PjBL model and the Canva media that you have used?	3.30	Positive
6	Were you attracted to the images in the Canva media using the PjBL model?	4.00	Very Positive
7	Did you enjoy sharing tasks with your group mates when working on assignments?	3.33	Positive
8	Was the teacher's presentation of the PjBL model clear?	3.56	Very Positive
9	Did learning using the PjBL model with discussion activities make it easier for you to formulate solutions to group assignments?	3.41	Positive
10	Did the presentation activity improve your communication skills?	3.70	Very Positive
11	I was interested in listening to the presentations from other groups' discussions.	3.00	Positive
12	Through learning activities using the PjBL model, I was able to learn science in an interesting way.	3.63	Very Positive

Based on Table 3, there are seven aspects that are still not optimal. These seven aspects include student impressions, students experiencing difficulties, teacher explanations, advantages of the model used, students' feelings when sharing assignments with peers, discussion activities facilitating group assignments, and interest in listening to presentations. Therefore, the researcher made improvements to the teaching modules, student worksheets (LKPD), and interactive Canva media to make them more engaging and facilitate students' science learning in class.

The results of the limited testing indicate that student responses to the implementation of the learning model were positive. Students showed interest in PjBL and the use of interactive Canva media. PjBL provides a more realistic and contextual learning experience, making students more enthusiastic about creating projects as a process of understanding the material. PjBL provides students with experience through learning and practice in organizing projects, as well as allocating time and other resources, such as equipment, to complete assignments (Majid, 2015).

Furthermore, the use of interactive visual media helps students understand abstract concepts more concretely. The use of interactive learning media can help students think more clearly. According to Mayer, the combination of verbal and visual elements in digital media (Canva) can improve student understanding and retention. Digital media also offers advantages such as ease of access, interactivity, and the ability to visualize abstract concepts (Taufiq et al., 2025).

Initial conditions indicated that learning was still conventional, resulting in low student participation and underdevelopment of creative thinking and collaboration skills. However, after implementing the PjBL model supported by the developed interactive Canva application, students' creative thinking and collaboration skills developed. This aligns with 21st-century learning theory, which emphasizes the development of critical thinking, collaboration, communication, creativity, and problem-solving skills through contextual learning (Fitriana, 2018).

However, several aspects still need improvement and refinement, such as the clarity of teacher explanations, the division of tasks within groups, and student interest in presentation activities. This is a normal phenomenon, as changes in learning strategies require an adaptation process. Based on this, revisions were made to the learning tools, particularly the teaching modules, worksheets, and learning media, to improve learning effectiveness. These revisions aimed to enhance student comfort and understanding during the learning process.

5. Wider testing

After the product was revised, the researchers conducted a main field trial. The main field trial was conducted with one class of 30 students. The results of the student response questionnaire regarding the implementation of Canva-assisted interactive PjBL in science learning are as follows.

Table 4. Results of the Student Response Questionnaire in the Main Field Trial

No	Aspect Assessed	Average Score	Description
1	What is your impression of the recent learning about plant parts using the PjBL model?	3.51	Very Positive
2	Did you find it difficult to follow the science learning activities using the PjBL model?	3.54	Very Positive
3	Was the teacher's explanation of science and the material on plant parts easy to understand?	3.35	Positive
4	Did the Canva media used help you understand the material more easily?	3.68	Very Positive
5	Are there any advantages to learning science using the PjBL model and the Canva media that you have used?	3.46	Positive
6	Were you attracted to the images in the Canva media using the PjBL model?	4.00	Very Positive
7	Did you enjoy sharing tasks with your group mates when working on assignments?	3.43	Positive
8	Was the teacher's presentation of the PjBL model clear?	3.59	Very Positive
9	Did learning using the PjBL model with discussion activities make it easier for you to formulate solutions to group assignments?	3.51	Very Positive
10	Did the presentation activity improve your communication skills?	3.73	Very Positive
11	I was interested in listening to the presentations from other groups' discussions.	3.27	Positive
12	Through learning activities using the PjBL model, I was able to learn science in an interesting way.	3.65	Very Positive

Based on Table 4, four aspects remained suboptimal, despite improvements compared to the initial field test. These four aspects included teacher explanations, the advantages of the model used, students' feelings when sharing assignments with peers, and their interest in listening to presentations. Therefore, the researchers further refined the activities in the teaching module and student worksheets to facilitate students' science learning in class.

After the product revisions, the researchers conducted a final field trial. The final field trial involved two classes with 76 students. The results of the student response questionnaire regarding the implementation of interactive Canva-assisted PjBL in science learning are as follows.

Table 5. Results of the Student Response Questionnaire in the Final Field Trial

No	Aspect Assessed	Average Score	Description
1	What is your impression of the recent learning about plant parts using the PjBL model?	3.59	Very Positive
2	Did you find it difficult to follow the science learning activities using the PjBL model?	3.61	Very Positive
3	Was the teacher's explanation of science and the material on plant parts easy to understand?	3.50	Very Positive
4	Did the Canva media used help you understand the material more easily?	3.72	Very Positive
5	Are there any advantages to learning science using the PjBL model and the Canva media that you have used?	3.54	Very Positive
6	Were you attracted to the images in the Canva media using the PjBL model?	3.95	Very Positive
7	Did you enjoy sharing tasks with your group mates when working on assignments?	3.63	Very Positive
8	Was the teacher's presentation of the PjBL model clear?	3.66	Very Positive
9	Did learning using the PjBL model with discussion activities make it easier for you to formulate solutions to group assignments?	3.64	Very Positive
10	Did the presentation activity improve your communication skills?	3.82	Very Positive
11	I was interested in listening to the presentations from other groups' discussions.	3.57	Very Positive
12	Through learning activities using the PjBL model, I was able to learn science in an interesting way.	3.66	Very Positive

Based on Table 5, one aspect decreased compared to the main field trial, although it remained in the very positive category. This aspect was interest in the images in Canva. Therefore, the researchers made improvements to the interactive Canva media to make it more engaging for students.

Based on the findings from the extensive trial, both the main and final field trials showed an increase in positive student responses to the learning process. In the main field trial, most learning aspects improved compared to the limited trial. In the final field trial, all aspects were in the very positive category. This indicates that the revised learning product improved the quality of the learning model and increased student motivation and engagement in the learning process. The increased student responses indicate that the PjBL model supported by the interactive Canva application was able to create a conducive and participatory learning environment. Students became more active in group discussions and more confident in expressing their opinions. This suggests that learning that combines technology and a problem-based approach in project design can increase student motivation and engagement in learning (Majid, 2015; Noviati, 2023; Taufiq et al., 2025; Zuhriyah et al., 2025).

These findings align with Dewey's theory, which states that learning should be oriented toward real-life experiences and involve students in investigating everyday life problems (Zuhriyah et al., 2025). PjBL enables students to understand learning material through direct experience, making learning more contextual and meaningful. Meaningful learning will help students develop optimal thinking skills and social skills. This aligns with the characteristics of PjBL, which uses contextual problems as a learning resource (Majid, 2015; Trianto, 2014).

According to Piaget, learning will be more meaningful when students actively construct knowledge through direct learning experiences (Zuhriyah et al., 2025). PjBL provides students with the opportunity to find their own solutions to problems through project-building activities, thus fostering a process of knowledge construction. Furthermore, Vygotsky emphasized that learning occurs through social interaction and collaboration among students (Hidayat, 2025). PjBL supports this theory through discussion and group work activities that help students complete projects, leading to a deeper understanding of the material. Bruner stated that learning that involves independent discovery will produce more meaningful understanding (Zuhriyah et al., 2025). This principle emphasizes the need for students to be actively involved in the inquiry process to independently discover learning concepts.

PjBL encourages students to discover concepts through problem investigation, design, creation, and testing of projects in the form of products that can solve the identified problems. The results of this study indicate that the development of the PjBL model, supported by the interactive Canva application, not only enhances students' creative thinking and collaboration skills but also creates more innovative, contextual, and enjoyable learning, increasing student engagement. The learning activities also demonstrate a shift towards student-centered learning. National education emphasizes student-centered learning in the 21st century (Komara, 2018). In other words, this model can be an alternative learning model that aligns with the demands of the independent curriculum, implementing an in-depth learning approach and 21st-century learning.

The PjBL model is a learning model that confronts students with real-world problems, encouraging them to research, analyze, and find solutions through project design, construction, and testing activities. PjBL also places students at the center of learning and trains them to develop higher-order thinking skills and problem-solving skills through scientific methods, namely experiments. PjBL also presents contextual problems before the learning process begins, thereby increasing student engagement (Majid, 2015). Furthermore, PjBL can present challenging problems and guide students in designing, solving problems, making decisions, conducting investigations, and providing opportunities for independent work (Wena, 2019). These findings align with Piaget's constructivist theory, which states that knowledge is built through active learning experiences. Piaget also emphasized that students must be directly involved in the learning process through exploration, object manipulation, and independent solution-finding to foster meaningful knowledge formation.

The use of the interactive Canva application also supports the learning process because it presents material in a visual, engaging, interactive, and contextual manner. This supports 21st-century learning, which demands technological literacy and increases student engagement in the learning process. Canva is a digital design platform that provides various presentation templates and visual media that can help teachers deliver learning materials in an engaging manner (Junaedi, 2021). Using Canva in learning can enhance students' creativity and communication skills (Chamidah, 2022). Furthermore, the use of engaging, visual learning tools and direct interaction with students allows students to optimally absorb information, allowing them to express their opinions confidently (Wibowo, 2013). Interactive learning media has been proven to help students understand material more clearly and increase their confidence in expressing ideas or opinions. Therefore, the integration of the PjBL model with the interactive Canva application can create innovative learning that aligns with the demands of modern learning.

Effectiveness of the PjBL model with the interactive Canva application on creative thinking skills

After collecting the data, researchers tested the effectiveness of the PjBL model with the interactive Canva application on students' creative thinking and collaboration skills. The model effectiveness test aims to determine the extent to which the implementation of the PjBL model, supported by the interactive Canva application, can improve students' creative thinking skills. At this stage, the model's effectiveness is planned to be measured by comparing pretest and posttest results. The following are the results of data processing using SPSS software.

Table 6. Effectiveness of the Canva Interactive-Assisted PjBL Model on Creative Thinking Skills

Data	Initial Test		Main Test		Operational Test	
	Pre	Post	Pre	Post	Pre	Post
Number of Students	27	27	37	37	76	76
Minimum	10	16	10	16	10	16
Maximum	15	20	15	20	15	20
Mean	12.15	18.26	12.16	18.27	12.33	18.66
Normality	0.043	0.032	0.006	0.001	0.000	0.000
Homogeneity	0.876		0.321		0.008	
Wilcoxon Test	0.000		0.000		0.000	
N-Gain	0.7856		0.7873		0.8302	

Based on Table 6, the data obtained from the normality and homogeneity tests almost all had a significance value <0.05 , indicating that they did not meet the normality and homogeneity tests. Therefore, the researchers conducted a non-parametric test, using the Wilcoxon test, to assess the effectiveness of the PjBL model on students' creative thinking skills.

The Wilcoxon test results showed that the significance value for the initial test, main test, and operational test was $0.00 < 0.05$, indicating that the PjBL model assisted by the interactive Canva application was proven effective in improving students' creative thinking skills. The effectiveness test results indicated a trend towards an increase in students' creative thinking skills after implementing the learning model. Furthermore, the N-gain for the initial test, main test, and operational test was categorized as high, indicating effectiveness.

The research findings indicate that the implementation of the PjBL model assisted by interactive Canva significantly improved students' creative thinking skills. Creative thinking is a form of cognitive thinking (Yuliani, 2017). The improvement in creative thinking skills occurs because the PjBL model provides students with opportunities to confront real-life problems and find solutions through project- building activities (Bender, 2012).

Furthermore, creative thinking consists of four main indicators: fluent thinking, flexible thinking, original thinking, and elaboration skills (Munandar, 2012). In this study, PjBL activities facilitated these four indicators through investigation, design, creation, and testing of projects. The PjBL model also provides students with opportunities to develop higher-order thinking skills because they are faced with real-life problems and guided to find solutions.

The use of interactive Canva media also plays a role in improving conceptual understanding because the presentation of material becomes more engaging and easier to understand, aiding students in the process of investigating, analyzing, and evaluating information. Furthermore, the use of interactive Canva media helps students understand material visually, facilitating the creative thinking process. Visual media can stimulate imagination and help students understand the relationships between concepts (Taufiq et al., 2025). Thus, the implementation of PjBL using the interactive Canva application has proven effective in developing students' creative thinking skills through contextual and meaningful learning experiences. The results of this study align with constructivist theory, which states that knowledge is built through active learning experiences. Learning that presents problems provides students with hands-on experience, making the knowledge gained more meaningful (Hidayat, 2025).

Effectiveness of the PjBL model using the interactive Canva application on collaboration skills

Furthermore, the researchers also calculated the effectiveness of the PjBL model using the interactive Canva application on students' collaboration skills. The following are the results of data processing using SPSS software.

Table 7. Effectiveness of the PjBL model using the interactive canva application on collaboration skills

Data	Initial Test		Main Test		Operational Test	
	Pre	Post	Pre	Post	Pre	Post
Number of Students	27	27	37	37	76	76
Minimum	57	89	57	89	57	89
Maximum	63	98	60	94	60	94
Mean	59.33	92.71	58.30	91.09	58.12	90.81
Normality	0.000	0.000	0.000	0.000	0.000	0.000
Homogeneity	0.000		0.001		0.000	
Wilcoxon Test	0.000		0.000		0.000	
N-Gain	0.8267		0.7876		0.7815	

Based on Table 7, the data obtained from the normality and homogeneity tests all had a significance value <0.05 , indicating that they did not meet the normality and homogeneity tests. Therefore, the researchers conducted a non-parametric test, using the Wilcoxon test, to assess the effectiveness of the PjBL model on students' collaboration skills. Furthermore, the N-gain scores for the initial test, the main test, and the operational test were categorized as effective. In other words, the implementation of the PjBL model with the help of the interactive Canva application was very effective on collaboration skills.

Based on the findings, in addition to improving creative thinking skills, this learning model also proved effective in enhancing students' collaboration skills. This improvement was evident in students' abilities to work together, divide tasks, discuss, and take responsibility for project completion. Collaboration is one of the essential 21st-century skills that students must possess, involving interaction between students to achieve common goals (González-Salamanca et al., 2020; Prasutri et al., 2019; Sulaiman & Sharill, 2015; Yanto et al., 2024). This means that when students interact effectively during project development, they demonstrate development in their collaborative skills (Mardawati et al., 2022).

These findings align with the concept of 21st-century skills, which positions collaboration as a crucial competency for students, aiming to train them to interact and work together to achieve common goals. Collaboration is the interaction between individuals to achieve common goals through communication, discussion, and teamwork, through the division of roles and responsibilities within a group. Collaboration is the process of interaction between several individuals to achieve a common goal (Kusnandar, 2013), and each individual involved must have clear roles and responsibilities (Widodo & Wardani, 2020). Greenstein added that collaborative learning can increase students' active participation, productive work skills, and respect for others' opinions (Nurmala and Priantari, 2017).

Johnson and Johnson suggest that collaborative skills encompass five indicators: positive interdependence, group interaction, individual responsibility, communication skills, and the ability to work in groups (Meilinawati, 2018). In this study, the PjBL model provides students with opportunities to develop these indicators through group discussions, group investigations, collaborative problem-solving, project creation, product trials, and presentations of student work.

Furthermore, Vygotsky's social constructivism theory emphasizes that learning occurs through social interactions between students and the learning environment (Hidayat, 2025). Through group work in PjBL, students can help each other understand concepts and create products to solve problems as a result of the project. This allows learning to occur within the zone of proximal development and collaborative knowledge construction, leading to optimal conceptual understanding. Group discussions, assignments, and presentations of group work provide important social experiences for students. Through these activities, students learn to respect others' opinions, take responsibility for assignments, and develop interpersonal communication skills.

The use of interactive Canva also supports the collaborative process by enabling students to work together on presentations and share discussion outcomes. Canva is not only a visual aid, but also a medium that encourages teacher-student collaboration in producing contextual and personalized learning products (Taufiq et al., 2025). In other words, digital media provides opportunities for students to collaborate more creatively and innovatively.

Improved collaboration skills demonstrate that PjBL not only enhances cognitive aspects but also enhances students' social and emotional aspects. Therefore, PjBL activities supported by the interactive Canva application have been shown to foster social interactions that support the development of students' collaboration and communication skills.

CONCLUSION

Based on the research and discussion on the development of a Canva-assisted interactive PjBL model to improve the creative thinking and collaboration skills of fourth-grade elementary school students, the following conclusions were reached. The development of the Canva-assisted interactive PjBL model was conducted through a Research and Development method, referring to the Borg & Gall model. The model development resulted in learning tools in the form of learning syntax, teaching modules, student worksheets (LKPD), interactive Canva media, and assessment instruments. The learning model was designed through six main stages: defining fundamental questions, project planning, scheduling, project monitoring, outcome testing, and evaluating the learning experience. Model development included needs analysis, product design, expert validation, limited trials, extensive trials, and final product revision.

The feasibility of the Canva-assisted interactive PjBL model was declared highly valid based on validation results from material experts, learning model experts, and media experts. All developed learning tools met the feasibility criteria, although several revisions were made to the aesthetic aspects of the teaching modules, the clarity of the LKPD instructions, and refinement of the test questions. The results of the field trial showed that the learning model received positive to very positive responses from students, thus deeming the model suitable for use in fourth-grade science lessons.

The effectiveness of the PjBL model, supported by the interactive Canva application, was proven to improve students' creative thinking skills. This was demonstrated by the Wilcoxon test results and the average N-gain value, which indicated a significant difference in students' creative thinking skills, with each test showing an effective category. The PjBL model provides students with opportunities to explore ideas, develop creativity, and produce meaningful learning products.

This learning model was also effective in improving students' collaboration skills. This was demonstrated by observations of student activities and student questionnaire responses, which indicated an effective category throughout all stages of the trial. The Wilcoxon test results and the average N-gain value indicated a significant difference in students' collaboration skills, with each test also showing an effective category. PjBL supported by the interactive Canva application encouraged student collaboration, communication, and responsibility in completing group assignments.

Overall, the development of the PjBL model, supported by the interactive Canva application, proved feasible and effective for use in learning to improve the creative thinking and collaboration skills of elementary school students. This model can be used as an alternative learning innovation that is in accordance with the demands of 21st century education.

A limitation of this study is that it is digitally based, and not all schools have complete facilities. Furthermore, this study requires teachers and students to operate technology that not all students and teachers understand. Furthermore, this study also carries the risk of focusing learning more on the product, rather than the process of making the product. Therefore, this study is expected to serve as a reference and consideration for other researchers who wish to conduct research with the same title. Further research is recommended to expand the subject to different educational levels, measure the resilience of learning outcomes (retention), and evaluate the long-term impact on soft skills such as collaboration and digital innovation.

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