



# Contextual Projective Learning Model in Elementary School Science Education: An Analysis of the Learning Process and Student Engagement

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## ABSTRACT

This study investigates the implementation of the Contextual-Projective Learning Model (KP) in elementary school science and its impact on student engagement and conceptual understanding, aiming to explore how contextual and project-based learning can foster meaningful learning experiences. The research was conducted at SD Aisyiyah Kalianda, focusing on the water cycle topic. A qualitative descriptive approach was employed, combining classroom observations, semi-structured interviews with teachers and students, and analysis of learning documentation. Data were analyzed thematically using Miles, Huberman, and Saldaña's interactive model to identify patterns in the learning process and student engagement. Findings indicate that KP effectively transforms the learning environment from teacher-centered to student-centered, positioning students as active knowledge constructors. Students engaged in discussions, collaboratively planned and executed mini-projects, and presented outcomes, enhancing cognitive, social, emotional, and behavioral engagement. Conceptual understanding improved as students connected theoretical knowledge with practical observation. The approach also fostered 21st-century skills, including critical thinking, creativity, collaboration, and communication (4C skills). Challenges such as limited instructional time, varying student abilities, and constrained resources were mitigated through structured project planning, differentiated guidance, peer teaching, and creative use of simple, local materials. This study highlights the integration of contextual learning with project-based activities in elementary science, emphasizing simultaneous development of conceptual understanding and 21st-century skills, with the teacher acting as an active facilitator. The findings provide both theoretical insights into constructivist, student-centered learning and practical guidance for implementing effective, meaningful science education at the elementary level.

## INTRODUCTION

Education is a strategic instrument for improving human resources, especially in addressing the challenges of the 21st century. Modern education emphasizes not only knowledge acquisition but also the development of critical thinking, creativity, collaboration, and communication skills commonly known as 21st-century skills (Fahri, 2025). Therefore, enhancing the quality of education requires improving learning processes that actively involve students in constructing meaningful knowledge (Pandales, Yollanda, Yani, Mardotila, & Prayanto, 2025).

In recent years, the shift from teacher-centered to student-centered learning has become increasingly prominent, driven by technological developments and the demands of a digital society (Sinaga & Firmansyah, 2024). Learning is expected to provide opportunities for students to engage actively through contextual and experiential activities (Vieri, Azmi, & Gusmaneli, 2025). However, in many elementary classrooms, teaching still relies heavily on lectures and conventional assignments, resulting in limited student engagement and superficial conceptual understanding (Anggriani, Sitianingrum, & Mulyono, 2025; Serly et al., 2025). This gap between

teaching practices and the goals of active, meaningful learning underscores the need for innovative instructional models.

Science learning in elementary education, in particular, requires active student participation, as its concepts are closely linked to natural phenomena and daily life experiences (Pahru, Hikmah, Pransisca, & Gazali, 2025). Traditional approaches that focus solely on abstract concepts often make it difficult for students to understand and apply scientific principles concretely (Rahmadini, Taofik, & Soleh, 2025). Previous research has demonstrated that contextual learning and project-based approaches can improve conceptual understanding and student engagement (Suhermi, Barokah, & Kamal, 2025; Cahyati & Sriwijayanti, 2024). Nonetheless, studies that specifically examine the integration of contextual learning with project-based activities—particularly the learning process and student engagement in elementary science—remain limited.

The Contextual–Projective Learning Model (KP) addresses this gap by combining contextual learning with simple project-based activities that connect science concepts to real-life experiences. Students are encouraged to observe, explore, collaborate, and apply concepts in meaningful ways, while teachers facilitate, guide, and provide feedback throughout the process (Prasetya & Trisnawati, 2021; Suhermi, Barokah, & Kamal, 2025). Moreover, integrating digital tools, such as educational videos and simulations, can further enhance engagement and support the development of early digital literacy (Kurniawan, Adrias, & Syam, 2025).

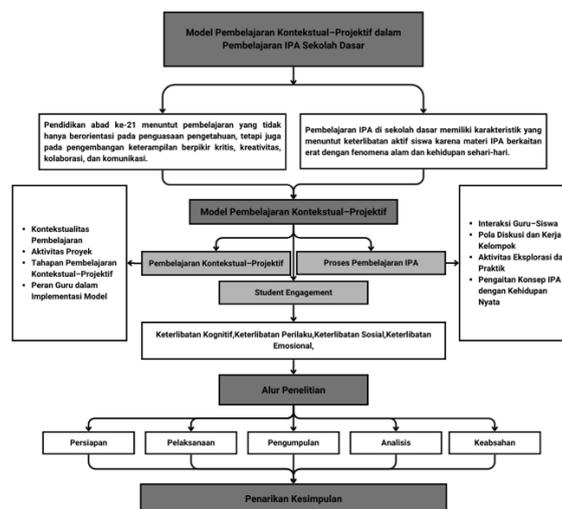
Despite the proven benefits of contextual and project-based learning, there is limited research examining how the Contextual–Projective Learning Model specifically affects the learning process and holistic student engagement in elementary science classrooms. Understanding these aspects is essential for designing learning experiences that are both meaningful and effective.

This study aims to analyze the learning process and student engagement in the implementation of the Contextual–Projective Learning Model in elementary school science learning. The results are expected to provide theoretical insights and practical guidance for teachers in creating student-centered, active, and contextually relevant science learning environments.

## RESEARCH METHOD

This study employed a qualitative approach with a descriptive design to provide an in-depth understanding of the learning process and student engagement in elementary school science through the Contextual–Projective Learning Model (Creswell & Poth, 2018; Nababan & Marpaung, 2024). A qualitative descriptive method was chosen because the aim was not to test hypotheses or quantify effects, but to explore and describe the learning phenomena within the natural classroom context, capturing both process and interaction dynamics.

The research was conducted at SD Aisyiyah Kalianda, involving classroom teachers and students actively participating in science lessons using the Contextual–Projective Learning Model. Participants were selected through purposive sampling to ensure that those chosen were directly engaged in the targeted learning activities and could provide rich information on the learning process (Ridho et al., 2025).



Data collection combined multiple techniques to ensure depth and triangulation. Classroom observations focused on teacher facilitation, learning stages, and student engagement, including cognitive, behavioral, social, and emotional aspects. Semi-structured interviews were conducted with teachers and selected students to explore their experiences, perceptions, and reflections on learning activities. Documentation, such as lesson plans (RPP/teaching modules), student worksheets, project outputs, and photographs of learning activities, was collected to complement observational and interview data (Creswell & Poth, 2018; Nababan & Marpaung, 2024).

Data analysis followed the interactive model of Miles, Huberman, and Saldaña, comprising data reduction, data display, and conclusion drawing. Themes were identified to reveal patterns in learning processes and forms of student engagement throughout the implementation of the Contextual-Projective Learning Model. Thematic analysis allowed for systematic interpretation of complex qualitative data while maintaining the richness of classroom experiences (Creswell & Poth, 2018; Nababan & Marpaung, 2024).

To ensure the validity and credibility of findings, the study applied both technique triangulation and source triangulation. Observational data were cross-checked with interview responses and documentation, while perspectives from teachers and students were compared. This methodological rigor strengthens the trustworthiness of the results and ensures that the study accurately represents the actual classroom learning phenomena (Creswell & Poth, 2018; Nababan & Marpaung, 2024).

## RESULTS AND DISCUSSION

### *Implementation of the Contextual-Projective Learning Model in Science Learning*

The implementation of the Contextual-Projective Learning Model at SD Aisyiyah Kalianda on the topic of the water cycle was conducted through face-to-face learning by utilizing the surrounding environment as a contextual learning resource. The learning process demonstrated a clear shift from a teacher-centered approach to a student-centered approach. In this context, the teacher acted as a facilitator by presenting guiding questions related to natural phenomena close to students' daily lives, such as rainfall or water puddles, which successfully stimulated students' curiosity, enthusiasm, and active participation in the learning process.



Students then continued the learning activities through a mini-project involving the creation of a water cycle model using simple materials, such as plastic bottles, water, and transparent plastic. This project-based activity emphasized planning processes, collaboration among group members, and students' ability to connect hands-on activities with science concepts. Throughout the project implementation, the teacher provided flexible guidance and support without reducing students' independence, allowing learners to explore, experiment, and construct their own understanding of the water cycle concepts.

### *Stages of the Contextual-Projective Learning Model Implementation*

The implementation of the Contextual-Projective Learning Model in science learning was carried out in structured stages, beginning with problem identification, followed by project planning, project execution, presentation of results, and reflection. Each stage emphasized active interaction between teachers and students, as well as authentic learning experiences through project activities. This staged approach enabled students to engage meaningfully with scientific concepts, enhanced their conceptual understanding, and fostered higher levels of cognitive, social, and behavioral engagement throughout the learning process.

**Table 1.** Stages of Implementing the Contextual-Projective Learning Model

Learning Stage	Teacher Activities	Student Activities	Observation Findings / Notes
Identification of Contextual Problems	Posing guiding questions related to natural phenomena closely connected to students' daily lives (e.g., rain and water puddles).	Responding to questions, sharing personal experiences, and expressing opinions based on everyday observations.	Students demonstrated high enthusiasm and responsiveness; several students actively shared real-life experiences related to rain and water puddles in their surroundings.
Project Planning	Providing general guidance and ensuring that the project plan aligns with the science learning objectives.	Designing a water cycle mini-project, selecting materials, distributing group tasks, and outlining work procedures.	Students showed strong collaborative skills, a sense of responsibility toward group tasks, and clear role distribution within groups.
Project Implementation and Teacher Facilitation	Monitoring the project implementation process and providing guidance and conceptual clarification when necessary.	Carrying out the project, engaging in group discussions, experimenting with various approaches, and assisting peers.	Students actively participated in discussions, demonstrated creativity, and completed the project with minimal teacher assistance; they showed improved understanding of evaporation, condensation, and precipitation concepts.
Presentation of Project Outcomes	Facilitating presentations, posing follow-up questions, and assessing students' conceptual understanding.	Explaining the water cycle mini-project, linking observed processes to scientific concepts, and responding to questions from peers and the teacher.	Most students were able to explain the water cycle concepts using their own words and relate them to real-life experiences.
Learning Reflection	Leading reflective discussions by asking about learning	Reflecting on the project process, discussing challenges, and	Students recognized the connection between project activities and science concepts;



Learning Stage	Teacher Activities	Student Activities	Observation Findings / Notes
	experiences, challenges encountered, and conceptual understanding.	articulating lessons learned.	learning was perceived as more meaningful and reflective.

The table above indicates that the implementation of the Contextual-Projective Learning Model was carried out in sequential stages to maximize student engagement and conceptual understanding. During the problem identification stage, the teacher stimulated students' curiosity through contextual questions related to everyday phenomena, such as rain or water puddles, enabling students to connect scientific concepts with their real-life experiences (*"When the teacher asked about rain or water puddles, I immediately remembered my experience of small floods around my house, so it was easier to understand."* - Student D).

The project planning stage emphasized students' ability to plan activities and divide tasks, thereby fostering responsibility and collaboration (*"We divided the tasks some prepared the materials, others assembled the project so the project was completed quickly and everyone was involved."* - Student E).

During the project implementation and teacher facilitation stage, students actively interacted through experiments using a water cycle miniature, group discussions, and problem-solving activities, while the teacher observed and supported their creativity (*"Students appeared very creative; they tried various ways to observe the processes of evaporation and condensation on their own without continuous direction from me."* - Science Teacher).

The presentation stage allowed students to explain scientific concepts using their own language and relate them to real-life experiences (*"Explaining the project in front of my classmates made me more confident and helped me truly understand how the water cycle occurs."* - Student F). The reflection stage emphasized self-evaluation and comprehensive understanding, reinforcing students' cognitive, social, and emotional engagement as well as their concrete understanding of science concepts (*"Reflection helped students realize that all project activities were directly related to science concepts, not merely making a miniature."* - Science Teacher).

### **Science Learning Process through the Contextual-Projective Approach**

Science learning through the Contextual-Projective approach was interactive and participatory. The teacher facilitated learning by posing guiding questions, while students actively engaged in discussions, observations, and the construction of water cycle miniatures. Project-based activities transformed abstract concepts into concrete experiences, enhancing students' understanding, motivation, and collaboration. One student stated, *"I understand the water cycle more easily because I made the miniature myself,"* and the teacher added, *"Students appear creative and confident, and they are able to explain concepts using their own words."* The teacher's role as a facilitator ensured that all activities aligned with the learning objectives.

### **Student Engagement in Science Learning**

Student engagement in Contextual-Projective-based science learning was evident across cognitive, behavioral, social, and emotional dimensions. Students actively participated in discussions, explored concepts through water cycle mini-projects, and

presented the outcomes of their group work, indicating a holistic form of engagement that supports meaningful learning.

**Table 2.** Student Engagement in Contextual–Projective-Based Learning

Aspect	Indicators	Findings
Cognitive	Asking questions, analyzing phenomena, explaining concepts	85% of students were able to relate the water cycle concept to real-life experiences
Behavioral	Activeness, responsibility, discipline in completing the project	88% of groups completed the project on time with clearly defined roles
Social	Collaboration, communication, coordination	All groups worked collaboratively and supported members who experienced difficulties
Emotional	Enthusiasm, learning motivation	Students were happy, interested, and highly motivated to participate in the project

The table indicates that student engagement in Contextual–Projective learning occurs holistically, encompassing cognitive, behavioral, social, and emotional aspects. Most students were able to connect science concepts with real-life experiences, as expressed by Student A: *“I found it easier to understand the water cycle because I made the miniature myself.”* Behavioral engagement was evident in students’ ability to complete projects on time with clearly defined roles, as stated by Student B: *“We divided the tasks clearly, so all members were involved and the project was completed on schedule.”* Social engagement was reflected in collaboration and mutual assistance among group members, while emotional engagement was shown through students’ motivation and enjoyment in learning, as expressed by Student C: *“Learning science became fun because we could discuss with friends and make projects, not just read books.”* These interview results strengthen the observational findings, confirming that the Contextual–Projective model not only enhances conceptual understanding but also promotes active participation, collaboration, and overall learning motivation.

### ***Teachers’ and Students’ Responses to the Contextual–Projective Learning Model***

The results of interviews and observations show that the Contextual–Projective Learning Model was well received by both teachers and students and had a positive impact on the science learning process. Teachers perceived that the model increased student activeness and facilitated conceptual understanding, as one teacher stated: *“With this model, students are more active in asking questions and discussions, become more confident in expressing opinions, and try to explain concepts in their own words.”* Students also reported enjoyable and easily understood learning experiences through the miniature project, for example, Student A stated: *“I found it easier to understand the water cycle because I made the miniature myself,”* Student B said: *“Learning science became fun because we could discuss and make projects,”* and Student C added: *“I feel more confident explaining the project results in front of my classmates.”* These findings indicate that the contextual–projective approach significantly enhances students’ motivation, curiosity, communication skills, and social and emotional engagement.

### ***Development of Students’ Science Conceptual Understanding***

The implementation of the Contextual–Projective Learning Model had a positive impact on students’ science conceptual understanding. Active engagement through the water cycle miniature project enabled students to connect theory with real phenomena, such as evaporation, condensation, and rainfall. Prior to implementation, most students

understood science concepts only theoretically; after the project, they were able to explain concepts in their own words and demonstrated more reflective understanding. This is illustrated by Student A's statement: "I found it easier to understand the water cycle because I made the miniature myself," and Student B's comment: "Learning science became fun because we could discuss with friends and make projects, not just read books." Project activities functioned as contextual learning media that fostered critical thinking, detailed observation, and collaboration, thereby transforming abstract concepts into concrete and memorable learning experiences. During implementation, challenges such as limited time, differences in student abilities, and limited materials were addressed through session division, individual guidance, peer teaching, and the use of simple materials. Meanwhile, the teacher's role as a facilitator and mentor ensured that every student achieved optimal conceptual understanding.

### **Discussion**

#### ***The Significance of Implementing the Contextual-Projective Learning Model in Elementary Science***

The findings indicate that the implementation of the Contextual-Projective Learning Model (KP) at SD Aisyiyah Kalianda has strategic significance in creating meaningful learning (Ridho et al., 2025). This model positions students as active subjects who construct knowledge through real-life experiences and project-based activities. By linking science content with everyday phenomena, initially abstract concepts become more concrete and easier to understand. For example, through a water cycle miniature project, students can directly observe evaporation, condensation, and precipitation processes, enabling both cognitive and practical understanding. These findings align with previous studies showing that project- and context-based learning enhances conceptual understanding of science and promotes active student engagement (Hayati et al., 2013; Ulfa, 2020).

#### **Contextual-Projective Model and Student-Centered Learning Process**

The KP model shifts the teaching-learning dynamic to student-centered learning, where teachers act as facilitators and guides, while students take responsibility for planning, executing, and evaluating projects independently. Activities such as group discussions, project exploration, planning, and project presentation simultaneously enhance active learning, critical thinking, learning motivation, and social skills. The water cycle miniature project allows students to connect theory with real-world phenomena, making previously abstract science concepts more practical and deeply understood (Salsabila, 2024; Devanti et al., 2023).

#### ***Student Engagement in KP Learning***

Student engagement in this study encompasses cognitive, behavioral, social, and emotional aspects. Observations and documentation show that students actively ask questions, analyze, discuss, and collaborate in project implementation, while exhibiting high emotional motivation. One student remarked, "I understand the water cycle better because I made the miniature myself," while a teacher added, "Students appear creative and confident, able to explain concepts in their own words without much guidance." These findings are consistent with prior research on student engagement in project- and context-based learning (Novianti et al., 2023; Marganingtyas et al., 2025).

### ***Contribution of the Model to Science Concept Understanding***

The KP model effectively enhances meaningful understanding of science concepts. Students can systematically explain natural phenomena, observe, analyze, and draw conclusions through context-based projects. Activities linking science concepts with daily-life phenomena facilitate the transition from abstract to concrete concepts, cultivate critical and reflective thinking, and strengthen the connection between theory and students' real experiences, resulting in deeper and more applicable conceptual understanding (Berlian, 2025; Pepilina et al., 2025).

### ***Development of 21st-Century Skills (4C)***

KP supports the development of 21st-century skills: Critical Thinking, Creativity, Collaboration, and Communication (4C). Students analyze the water cycle (Critical Thinking), innovate in designing the miniature project (Creativity), collaborate effectively in groups (Collaboration), and present project results clearly and systematically (Communication). Thus, academic competence and 21st-century skills are achieved simultaneously (Berlian, 2025; Pepilina et al., 2025).

### ***Teacher's Role in Learning Success***

Teachers act as facilitators, mentors, and project supervisors in KP implementation. They begin learning with contextual questions, monitor project progress, provide feedback, and manage differences in student abilities through differentiated tasks, additional guidance, and peer teaching. Active teacher guidance ensures optimal science concept understanding while increasing motivation, discipline, and student engagement (Saputri, Rizkia, Alfiah, & Sabibah, 2024; Putri, Rahma, Silvarana, & Baqi, 2025).

### ***Implementation Challenges and Solutions***

Several challenges arose during KP implementation, including limited class time, student ability variation, and constrained resources. Strategies to address these challenges included dividing project stages into multiple sessions, providing individual guidance, peer teaching, and utilizing simple, locally available materials. These challenges became opportunities to design more effective and adaptive learning, maintaining optimal learning processes and student participation (Mawardah, Damayanti, Ramadhini, Suriansyah, & Pratiwi, 2025; Mertasari, Candiasa, & Purwa, 2018).

### ***Relation to Previous Studies***

These findings are consistent with Misbahudholam & Hardiansyah (2022), who demonstrated that contextual learning improves student interaction, conceptual understanding, and social skills. They also align with Fadilah et al. (2025), emphasizing that simple, real-life projects enhance motivation, conceptual understanding, and 21st-century skills (4C). This study extends prior research by highlighting the simultaneous integration of contextual projects and the enhancement of 21st-century skills, as well as the teacher's active role in facilitating engagement and learning outcomes.

### ***Theoretical and Practical Implications***

Theoretically, this study reinforces constructivist principles and student-centered learning, demonstrating that integrating real-world context with projects is an effective strategy for active knowledge construction. Practically, teachers are advised to

implement KP with active facilitation and the use of simple media, while schools and curriculum developers should provide adequate facilities, integrate contextual projects into the curriculum, and conduct teacher training to improve science learning quality (Pratami, 2024; Ahmad, Eka Saputra, & Suziman, 2025; Syafila & Qurotul A'yun, 2024).

## CONCLUSION

Based on the findings, the implementation of the Contextual-Projective Learning Model (KP) in elementary science at SD Aisyiyah Kalianda significantly enhances the learning process and student engagement. The model positions students as active knowledge constructors through real-life experiences and project-based activities, making previously abstract science concepts more concrete and easier to understand. For example, the water cycle miniature project enables students to directly observe and explain evaporation, condensation, and precipitation, resulting in meaningful cognitive and practical understanding.

KP shifts learning from teacher-centered to student-centered, with teachers acting as facilitators and guides while students independently plan, execute, and evaluate projects. Student engagement occurs holistically across cognitive, behavioral, social, and emotional dimensions, as they actively ask questions, discuss, collaborate, and demonstrate high motivation. The model also effectively develops 21st-century skills, namely Critical Thinking, Creativity, Collaboration, and Communication (4C). Teachers' guidance is crucial in providing feedback, differentiating support, and ensuring each student achieves conceptual understanding. Challenges such as limited time, student ability variation, and resource constraints can be addressed through phased project stages, individual guidance, peer teaching, and use of simple or local materials. Theoretically, this study reinforces constructivist and student-centered learning principles; practically, KP serves as an effective strategy for meaningful and contextual science learning.

For teachers, it is recommended to implement KP by emphasizing active student engagement through projects relevant to daily life, while providing differentiated guidance according to student ability. Teachers are also encouraged to utilize simple or digital media to enrich learning experiences and foster creativity.

For schools and curriculum developers, it is important to provide adequate facilities, integrate contextual projects into the curriculum, and conduct teacher training to improve science learning quality. Institutional support strengthens KP implementation and ensures sustainable, meaningful project-based learning. Future research should explore KP implementation in other subjects or educational levels, expand the use of digital technology in contextual-projective learning, and consider quantitative studies to measure the model's impact on learning outcomes more precisely. This will provide more comprehensive empirical evidence regarding KP's effectiveness in enhancing conceptual understanding and 21st-century skills.

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