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The Use of Mini Project-Based Learning Media to Develop Collaboration Skills in First Grade Students at SDN Tanjungsari

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Abstract. 21st century learning requires mastery of collaboration skills as part of the 4C competencies (critical thinking, creativity, collaboration, communication) that are important for future learning success. However, initial observations at SDN Tanjungsari in Pabuaran District show that first-grade students remain passive and struggle to collaborate effectively in completing group tasks, highlighting the need for improved learning strategies. This study aims to analyze the improvement of students' collaboration skills through the use of mini-project-based learning media designed in accordance with the principles of social constructivism, where knowledge is built through interaction and cooperation among students. The research method used is quantitative with a one-group pretest-posttest pre-experimental design. The research subjects consisted of 25 first-grade students. Data were collected using a collaboration skills observation sheet and analyzed using a paired sample t-test. The results showed a significant increase in students' collaboration skills after the implementation of mini-project media, with the average score increasing from 63.4 to 82.8 ($p < 0.05$). These findings confirm that simple and contextual project activities, such as creating collages and posters with environmental themes, are effective in fostering responsibility, communication, and cooperation. The implications of this study emphasize the importance of applying a mini-project-based learning approach as a strategy for integrating collaborative values from the elementary school level in order to realize active, meaningful, and participatory 21st-century learning.

Keywords: Collaboration, Learning Media, Mini Projects, Elementary School Students

INTRODUCTION

Basic education in the 21st century faces the challenge of preparing students to have skills that are relevant to global demands. One widely used framework is 4C, which includes critical thinking, creativity, communication, and collaboration (Thornhill-Miller et al., 2023). In this context, collaboration skills are an important foundation for shaping social and communication skills, as well as responsibility in learning. According to Habibi et al., (2025), mastering collaborative skills from an early age helps students adapt to the dynamics of group work and active learning, which require participation and empathy towards others.

Collaborative skills need to be developed from elementary school, especially in the lower grades, because at this stage children are in a very important early stage of social development. Initial observations at SDN Tanjungsari, Pabuaran District, show that first-grade students still tend to be passive, work more individually, and have difficulty working together to complete group assignments. This condition indicates the need for learning strategies that encourage social interaction and collaboration in learning activities.

The low level of collaboration skills among elementary school students is also evident in various national and international surveys and studies. The OECD Future of Education and

Skills 2030 report (OECD, 2023) confirms that although Indonesian students have shown improvement in literacy skills, their collaborative and teamwork skills are still low compared to other OECD member countries. Similar findings were also revealed by the Center for Assessment and Learning (Pusmendik, 2022), which stated that many elementary school students have difficulty communicating effectively in groups and are unable to resolve conflicts constructively. This phenomenon indicates a gap between the demands of 21st-century skills and classroom learning practices, which are still dominated by conventional and individualistic methods. Therefore, a more contextual, collaborative, and developmentally appropriate approach to learning is needed for young children.

One approach that is considered effective in developing collaboration is Project-Based Learning (PjBL). This model emphasizes the active involvement of students in designing, implementing, and reflecting on a meaningful project. According to Bell (2024), PjBL provides an authentic learning experience that allows students to develop collaboration, communication, and responsibility skills naturally through group work. The results of research conducted by Kumalasari et al., (2023) show that the application of the PjBL model in elementary schools significantly improves students' collaboration and social responsibility skills. Similarly, research by Khairunnisa (2021) found that project-based learning has a positive impact on students' interpersonal skills and participation in group learning.

The theoretical basis of this study is rooted in the social constructivism theory proposed by Lev Vygotsky. This theory emphasizes that knowledge is constructed through social interaction and cooperation between individuals in a socio-cultural context (Schunk and DiBenedetto, 2020; Vygotsky, 1978). In the context of collaborative learning, interaction between students becomes the main means of forming new knowledge. Teachers act as facilitators who provide scaffolding to support students in reaching their zone of proximal development. Thus, collaborative activities in mini-project-based learning are in line with the principles of social constructivism, where students actively construct their understanding through interaction and concrete experiences.

However, the challenges in implementing collaborative learning in lower grades are quite complex. Teachers need to consider the cognitive and social development levels of students and adjust learning media to remain simple, interesting, and relevant to everyday life. Therefore, mini-project-based learning media is seen as an appropriate alternative to stimulate collaboration skills through concrete, enjoyable, and meaningful activities for elementary school children.

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In addition to internal challenges in elementary school, the development of collaboration skills is also influenced by the learning environment and children's social habits. Students who are accustomed to interacting positively within the context of their family or community tend to have better collaboration skills at school (Grant and Ray, 2018). However, in some contexts, learning is still dominated by individual assessment, which leaves little room for collaborative activities. This shows that the development of collaboration skills requires a planned and continuous approach from teachers.

Mini projects as a form of small-scale project-based learning activities are considered appropriate for elementary school children. These activities allow students to experience a concrete, enjoyable learning process that is closely related to their daily lives. In mini project-based learning, teachers can integrate character values such as cooperation, responsibility, and mutual respect for friends' opinions (Shvets et al., 2024). Thus, this study not only focuses on improving cognitive aspects but also strengthens social-emotional learning, which is an important foundation in 21st-century education.

Based on this description, this study aims to analyze the effect of using mini-project-based learning media on improving the collaboration skills of first-grade students at SDN Tanjungsari. Through this study, it is hoped that a deeper understanding can be gained of how mini-project-based learning strategies can be implemented to strengthen collaborative competencies as part of 21st-century skills in elementary school students.

METHODOLOGY

Research Design

This study used a quantitative approach with a one-group pretest-posttest pre-experimental design. This design was chosen to examine the effect of using mini-project-based learning media on the collaboration skills of first-grade students at SDN Tanjungsari. The design involved measurements before (pretest) and after (posttest) the treatment to determine the changes that occurred after the implementation of the learning model (Creswell and Creswell, 2017; Sugiyono, 2021).

Subject and Research Location

The research subjects were all 25 first-grade students at Tanjungsari Elementary School, consisting of 13 male students and 12 female students. The sampling technique used saturated sampling because the entire population was used as the research sample. The

research was conducted over four meetings with the application of mini-project-based learning media designed collaboratively.

Research Procedures

The research was conducted through several systematic stages to ensure the optimal implementation of the learning model.

1. The first meeting focused on introducing the concept of collaboration through simple games that encouraged interaction among students.
2. The second to fourth meetings focused on project activities, ranging from planning and implementation to reflection on the results. During these activities, teachers acted as facilitators who helped students organize their ideas, solve problems, and foster responsibility for their respective roles.

Project activities were carried out in small groups with environmental themes, such as making collages and posters. These activities aimed to foster interaction, communication, and shared responsibility.

Research Instrument

Data were collected using a collaboration skills observation sheet developed based on indicators from the Framework for 21st Century Learning (Partnership for 21st Century Learning, 2019). The validity of the instrument was tested through expert judgment, while its reliability was obtained with a Cronbach's Alpha coefficient of 0.87, indicating a high level of reliability.

In addition to quantitative data, researchers also collected qualitative data in the form of field notes and reflections shared by classroom teachers. These reflections were used to evaluate the effectiveness of the media and project activities, as well as to identify the dynamics of collaboration and resolution of minor conflicts within the group. Qualitative data was used as triangulation to reinforce quantitative findings.

Data Analysis Techniques

Data analysis was performed using a paired sample t-test with SPSS version 26 to determine the significant difference between the pretest and posttest results of students' collaboration

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skills. The testing criteria were based on a significance value (p) < 0.05, which indicated an increase in collaboration skills after the implementation of mini-project-based learning media.

RESULTS AND DISCUSSION

This study was conducted at SDN Tanjungsari, Pabuaran District, Serang Regency, Banten Province, with 25 first-grade students as research subjects, consisting of 13 male students and 12 female students. The main objective of this study was to determine the improvement in students' collaboration skills after the implementation of mini-project-based learning media. Collaboration skills were measured through four main indicators, namely communication, responsibility, cooperation, and tolerance. Observations were conducted in two stages, namely pretest (before treatment) and posttest (after treatment).

The learning process was carried out over four meetings using a mini project-based learning approach. Students were divided into five small groups of five members each. Each group was given a simple project, such as making an environmental-themed collage, a poster about maintaining school cleanliness, and preparing a presentation of the group's work. Through these activities, each student was expected to participate actively, share ideas, and work together to complete group tasks.

The initial data (pretest) was used to determine collaboration skills before the implementation of mini-project-based learning media, while the final data (posttest) described students' skills after receiving the treatment.

Table 1. Descriptive Statistics of Students' Collaboration Skills

Statistic	Pretest	Posttest
Number of Students (n)	25	25
Minimum Score	55	75
Maximum Score	74	91
Mean	63.4	82.8
Standard Deviation	6.25	5.71

Based on Table 1, it can be seen that the average value of students' collaboration skills increased from 63.4 to 82.8 after learning using mini-project media was implemented. This increase of 19.4 points indicates a significant change in students' collaborative abilities. In addition, the minimum score, which was originally 55, increased to 75, while the maximum score increased from 74 to 91. The standard deviation decreased from 6.25 to 5.71, indicating that the distribution of data among students became more homogeneous, or in other words, most students experienced a relatively even improvement in their abilities.

1. Improvement in Each Collaboration Skill Indicator

To see which aspects were most developed, an analysis was conducted on four key indicators of collaboration skills: communication, responsibility, cooperation, and tolerance.

Table 2. Average Scores of Each Collaboration Skill Indicator

Indicator	Pretest Score	Posttest Score	Improvement (%)
Communication	62.0	84.5	22.5 %
Responsibility	63.2	83.0	19.8 %
Cooperation	64.1	81.6	17.5 %
Tolerance	64.5	82.0	17.5 %
Overall Average	63.4	82.8	19.4 %

Based on Table 2, the communication indicator showed the highest increase of 22.5%, followed by responsibility (19.8%), while cooperation and tolerance each increased by 17.5%. The increase in the communication indicator can be interpreted as meaning that during project activities, students interacted more frequently with their groupmates, discussed issues, and expressed their opinions. Meanwhile, the responsibility aspect increased because students were required to complete the tasks that were their responsibility in the project. In general, these results show that mini-project learning is able to create a collaborative environment that is conducive for lower grade students.

2. Normality Test

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Before conducting the t-test, the data was tested for normality using the Shapiro–Wilk test, as the sample size was less than 50 students.

Table 3. Normality Test Results (Shapiro–Wilk)

Variable	W Statistic	Sig. (p)	Description
Pretest	0.962	0.345	normal
Posttest	0.954	0.286	normal

Based on Table 3, the significance value of the pretest is 0.345 and the posttest is 0.286, both of which are greater than 0.05. Thus, the data is declared to be normally distributed. These results indicate that the data is suitable for analysis using a paired sample t-test.

3. Homogeneity Test

Next, a test of variance homogeneity was conducted using Levene's test to ensure that the two data groups had similar variances.

Table 4. Homogeneity Test Result

Levene's Statistic	Sig. (p)	Description
1.325	0.259	Homogeneous

A significance value of 0.259 > 0.05 indicates that the data is homogeneous. This means that there is no significant difference in variance between the pretest and posttest data.

4. Paired Sample T-Test

To test the research hypothesis, a paired sample t-test was used with the help of SPSS software version 26. This test aimed to determine whether there was a significant difference between the pretest and posttest mean scores.

Table 5. Paired Sample t-Test Result

Variable	Mean Pretest	Mean Posttest	t-value	Sig. (p)	Conclusion
Students' Collaboration	63.4	82.8	-11.72	0.000	Significantly different

The t-value of -11.72 with a p-value of 0.000 < 0.05 indicates that there is a significant difference between the pretest and posttest results. Thus, it can be concluded that the application of mini-project-based learning media has a significant effect on improving the collaboration skills of first-grade students at SDN Tanjungsari.

5. Summary of Analysis Results

To provide a more comprehensive overview of the research results, the following table summarizes the quantitative analysis results.

Table 6. Summary of Collaboration Skills Analysis Results

Assessment Aspect	Main Result
Research Design	One Group Pretest–Posttest
Number of Samples	25 first grade students
Mean Pretest Score	63.4
Mean Posttest Score	82.8
Improvement Difference	19.4 points (19.4%)
Significance Value (p)	0.000 (< 0.05)
Hypothesis Test Conclusion	There is a significant improvement
Highest Increased Indicator	Communication (22.5%)
Lowest Increased Indicator	Cooperation and Tolerance (17.5%)

This section of the results shows that the consistent use of mini-project-based learning media can improve the collaboration skills of elementary school students, particularly in terms of

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communication and group responsibility. Statistically, the improvement is significant and consistent across all indicators of collaboration skills.

The results of the study show that the application of mini-project-based learning media can significantly improve the collaboration skills of first-grade students at SDN Tanjungsari. The average collaboration skill score increased from 63.4 to 82.8 after the intervention. The results of the paired sample t-test showed a p-value of 0.000 (< 0.05), which means that there was a significant difference between before and after the treatment. This indicates that mini-project-based learning media has a positive effect on improving students' ability to interact, work together, and be responsible in group activities.

This finding confirms the theory that 21st-century learning requires mastery of collaborative competencies as part of the 4C skills (critical thinking, creativity, communication, collaboration) that form the foundation for future learning success (Supena et al., 2021). Collaborative skills are not merely the ability to work in groups, but also include aspects of individual responsibility for tasks, the ability to express opinions, and respect for the ideas of others. In the context of basic education, collaborative learning is the first step in forming good social character, especially when students are invited to interact in meaningful real-world projects that are appropriate for their stage of development.

Based on the results of the indicator analysis, the highest increase occurred in the aspect of communication (22.5%), followed by responsibility (19.8%), while the aspects of cooperation and tolerance also experienced an increase, albeit at a smaller percentage. The increase in the aspect of communication shows that mini-project media opens up a wide space for students to express their opinions, discuss, and convey ideas to their groupmates. In line with the results of Bell's (2023) research, project-based activities provide natural opportunities for students to develop interpersonal communication and critical thinking skills through guided group discussions.

Meanwhile, improvements in responsibility show that mini-project activities encourage students to understand the importance of completing their respective tasks for the success of the group. This is in line with Avsheniuk et al., (2023) opinion that project-based learning fosters a sense of ownership of the results of joint work, so that students are more disciplined and responsible for their roles. Thus, mini projects not only develop academic competencies, but also reinforce social values such as cooperation and collective responsibility.

From a theoretical perspective, the results of this study also support the principle of social constructivism proposed by Vygotsky (1978). In this theory, learning is considered effective when there is social interaction between students who act as co-learners and teachers who act as facilitators. Through mini-project activities, this interaction occurs actively and meaningfully as students help each other, exchange ideas, and build a common understanding. This process is in line with the concept of the zone of proximal development (ZPD), where collaboration between students enables them to achieve higher abilities than when learning individually.

In addition to measurable quantitative improvements through test results and observations, changes in student behavior were also evident in communication patterns during activities. At the beginning of the project, most students were still hesitant to express their opinions and tended to follow the lead of more dominant peers. However, in subsequent meetings, students began to show increased confidence by boldly offering ideas, asking questions, and providing feedback on other groups' work.

This improvement in behavior indicates the development of important social and emotional skills in the collaborative process. These results are in line with research by Hidayat and Hartati (2024), which states that project-based learning can be an effective means of fostering empathy and communication skills among students from an early age. Through active involvement in each stage of the project, students learn to respect the opinions of others while taking responsibility for the results of their group.

In addition, mini-project-based learning also has the potential to strengthen critical thinking skills. In each discussion session, students are presented with real-world problems such as maintaining school cleanliness or conserving natural resources. Teachers encourage students to find simple solutions through cooperation, such as creating posters promoting water conservation or designing environmental slogans. In this way, students not only develop collaboration skills, but also problem-solving and creativity skills at the same time.

In addition, the mini project-based learning media applied in this study proved to be suitable for lower elementary school students because it was designed with consideration of their age characteristics, who still enjoy learning through concrete and contextual activities. Activities such as making collages and posters with environmental themes become learning media that are not only fun but also foster social skills. This is reinforced by the findings of zhang et al., (2023), which show that the application of Project-Based Learning based on simple activities can increase collaboration and positive interactions among students in lower grades.

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Furthermore, the significant improvement in collaboration skills in this study also shows that the mini-project learning model can be an effective solution to the problem of low student participation in group work, as found in the initial observation at SDN Tanjungsari. Before the mini-project was implemented, students tended to be passive and preferred to work alone. However, after participating in project-based learning, students became more active and were able to complete tasks together with enthusiasm. This shows a shift in the learning paradigm from teacher-centered to student-centered learning, where students play an active role in the learning process.

The results of this study are consistent with the study by Isnani (2023), which found that the implementation of project-based learning in elementary schools can significantly improve student collaboration and engagement. Through project activities, students learn to identify problems, design solutions, share responsibilities, and achieve common goals. In this context, mini-project learning media at SDN Tanjungsari serves not only as a visual aid, but also as a vehicle for social interaction that shapes 21st-century skills.

Thus, the results of this study emphasize the importance of integrating mini project-based learning as one of the innovative learning strategies in elementary schools. The application of this type of media is relevant for strengthening students' social-emotional competencies from an early age and supporting the achievement of the Pancasila learner profile, particularly in the dimensions of mutual cooperation and critical thinking. Therefore, teachers at the elementary school level need to continue to develop simple project-based learning media that are not only results-oriented but also focused on collaborative and reflective processes among students.

Another interesting finding is the increased involvement of low-ability students in group activities. Students who were previously passive became more enthusiastic after being given specific responsibilities in projects, such as drawing, writing, or preparing presentation materials. This change shows that mini projects provide space for all students to contribute according to their respective potentials. According to Waskitaningtyas et al. (2024), learning strategies that give equal roles to all group members can increase students' sense of belonging and strengthen their intrinsic motivation to learn.

In addition, the results of the study also emphasize the importance of the teacher's role in facilitating group work to remain productive. Teachers not only act as guides, but also as mediators who help resolve differences of opinion among students. With proper guidance, mini

project-based learning not only trains cooperation, but also develops democratic values and conflict resolution skills in children.

CONCLUSION

Based on the results of research and data analysis that has been conducted, it can be concluded that the application of mini-project-based learning media has a significant effect on improving the collaboration skills of first-grade students at SDN Tanjungsari. This is demonstrated by the results of the paired sample t-test, which produced a significance value (p) = 0.000 < 0.05 with an average score increase from 63.4 to 82.8. This improvement covers all aspects of collaboration, namely communication, responsibility, cooperation, and tolerance, with the highest increase in the communication aspect at 22.5%.

The results of this study prove that simple projects designed collaboratively can foster social skills and shared responsibility from an early age. Students become more active in discussions, respect each other's opinions, and work together to complete group assignments. This is in line with the principles of social constructivism, whereby meaningful learning occurs through social interaction and cooperation among students.

In practice, the application of mini project-based learning can be used as an alternative learning strategy in lower elementary school grades to develop 21st-century competencies, particularly in the dimension of collaboration. Teachers are expected to continue developing various forms of mini projects that are relevant to students' daily lives, so that the learning process is not only oriented towards academic results, but also builds social skills, empathy, and mutual cooperation as characteristics of Pancasila learners.

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