

BUILDING 21ST CENTURY SKILLS IN THE DIGITAL ERA: THE ROLE OF THE PJBL MODEL ON THE COLLABORATION OF GRADE 5 STUDENTS

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Abstract

The digital era requires students to master 21st century skills, where collaboration is one of the crucial competencies that must be formed from an early age. However, challenges in the field show that passive interaction and individualism still dominate the conventional learning process at the elementary school level. This study aims to analyze the role of the Project-Based Learning (PjBL) learning model in improving the collaboration skills of grade 5 elementary school students. The research method used is a quasi-experimental type of *Nonequivalent Control Group Design* with data collection techniques through observation and questionnaires. PjBL was chosen because of its characteristics that are based on group investigation and real problem solving that are relevant to today's digital ecosystem. The results of the study showed that the implementation of PjBL significantly increased the indicators of student collaboration including: (1) Contribution in group discussions to 88.45%, (2) Time management to 85.75%, (3) Problem solving to 86.50%, (4) Working with friends 86.34%, (5) Investigation techniques 87.80%. The integration of digital devices in the PjBL project also accelerates access to information and coordination between students. The conclusion of this study emphasizes that PjBL is not just an instructional model, but a strategy to transform traditional classrooms into a collaborative and adaptive learning environment to the demands of the times.

Keywords: *Project-Based Learning (PjBL), 21st Century Skills, Collaboration, Digital Era, Elementary School.*

Introduction

Education in Indonesia currently faces challenges in improving the quality of learning and student achievement, especially at the elementary school level. The main challenge in the field of education is to cultivate the skills that students have in the 21st century. The 4C skills, which include communication, collaboration, critical thinking, and creativity, are the main pillars in the implementation of learning in the 21st century (Nurwahidah, 2021). These skills are crucial to equipping students to be ready to face global challenges and grow into adaptive and innovative individuals. This is in line with the current curriculum, namely the Merdeka curriculum which emphasizes character learning in accordance with the profile of Pancasila students. In it there are 6 dimensions, namely (1) Faith, Fear of God Almighty, and Noble Character, (2) Global Diversity, (3) Mutual Cooperation, (4) Independence, (5) Critical Reasoning and (6) Creative. All dimensions in the Pancasila Student Profile are in line with the phase of student development, including the aspect of mutual cooperation. According to Irawati (2022), collaboration is one of the key elements that make up the dimension of mutual cooperation. In addition, the Pancasila Student Profile is formulated as an answer to 21st century education problems, ensuring that students are ready to face the future (Zulkhi et al., 2023). Collaborative learning methods are increasingly important in the digital age because technology allows interaction and collaboration between students effectively, both in physical and virtual learning environments Männistö et al. (2019). Moreover, since 2024, some of these elementary schools have switched to a digital school system. This means that all students are required to bring a tablet that will be used as the main tool for learning. The integration of various digital instruments, ranging from online platforms to virtual learning environments, has provided added value to the student education process (Alshehri, 2024). The use of this technology has proven to be effective in honing crucial competencies such as digital literacy, problem-solving skills, and online cooperation skills. Based on field

observations carried out, the implementation of digital schools also has several negative impacts on students. They tend to be individualistic and focus more on *their respective gadgets*. So that the application of digital learning affects students' collaboration skills. This is in accordance with the results of the latest observations in the educational environment, students' ability to cooperate or collaborate is still considered not optimal (Octaviana et al., 2022). In order to improve students' collaboration skills, several learning models can be applied, one of which is the project-based learning model. Darmawan and Wahyudin (2018) stated that the learning model functions as a structural guide for educators in managing the instructional process. One model that is relevant to the demands of the 21st century is *project-based learning* (PjBL). The implementation of PjBL is considered very synchronous with the essence of the Independent Curriculum because it is able to answer contemporary educational challenges (Sidiq et al., 2021). In *Project-based learning*, students are the main focus of learning. They are free to plan learning activities, work on projects together, and create products that they can show others. According to Darmadi (2021), collaborative learning prepares students to work together and develop leadership skills. In this approach, students are actively involved in discussions, sharing ideas, exchanging views, and thinking deeply in search of clarity. Especially through *project-based learning* students not only understand academic material, but must learn to collaborate in teams, think critically, and find innovative solutions to various complex problems.

The application of *project-based learning* is one of the innovative steps to increase student creativity and collaboration. The material used for the research is data collection. This material involves students to learn directly through experience. They will be involved in the entire process, from designing surveys, collecting and analyzing data, to finally presenting the results. This process requires close cooperation between students and encourages them to think creatively in finding innovative and efficient ways to collect and analyze data. According to Apriet Bulqini, et al. (2021), this learning model focuses on the long-term learning process, which directly involves students in real issues and problems that they encounter on a daily basis. The goal is to teach students how to understand and solve problems that they actually face in their daily lives. This learning model is also interdisciplinary, involving various subjects, and is completely *student-centered*, where they are the main actors starting from designing, implementing, and reporting the results of their learning activities. SD Muhammadiyah 4 Surabaya as one of the educational institutions that is always committed to improving the quality of learning, continues to look for innovative ways to increase student involvement and motivation in learning. In this context, the application of *the project-based learning* model to data collection materials is expected to be an effective solution to increase the creativity and collaboration of grade 5 students. By combining modern educational theories with best practices in learning, this primary school strives to create a dynamic and inspiring learning environment for students.

This research is expected to be able to provide a clear discourse on the influence of the use of *project-based learning* on data collection materials on increasing creativity and collaboration of grade 5 students. This study also seeks to identify several factors as supporters and inhibitors of the implementation of *the project-based learning* model. Furthermore, the goal is to provide practical recommendations so that teachers and schools can implement this learning method in an effective and innovative way. Thus, this research not only makes a theoretical contribution to the development of *a project-based learning model*, but also provides practical contributions that can be directly applied in the field. It is hoped that the results of this research can be a reference for elementary schools in Surabaya and other basic education institutions in an effort to improve the quality of teaching and learning and prepare students to face the challenges of the world in the future.

Method

This study uses a quantitative approach with a quasi-experimental research type with the design applied is *Nonequivalent Control Group Design*. In this design, there are two classes (experiment and control) that are not randomly selected, but based on existing field observations. Both groups were given a *pre-test* and a *post-test* to measure the effect of treatment on student collaboration variables. The subjects

used were 5th grade students of SD Muhammadiyah 4 Surabaya where the control class had 25 students and the experimental class had 25 students. The choice of this location is based on the phenomenon of the implementation of digital schools in the school which has an impact on the decline of students' collaboration skills due to the tendency of individualism in the use of *gadgets*. In this study, the experimental class will be given a learning treatment with the PjBL model and the control class will be given treatment using the learning method as usually the teacher in the school delivers the material. Data was collected using relevant instruments, namely observation sheets during the project work process. The observation sheet of students' collaboration skills was analyzed using the percentage of assessment with the formula:

$$P = \frac{\sum f}{\sum N} \times 100\%$$

Description:

Q: percentage of collaboration skills

$\sum f$: total score obtained

$\sum N$: total maximum value

After the percentage of communication or collaboration skill indicators is obtained, the average is then calculated from observations made by

Table 1. Interpretation of Collaboration Percentage

Prosentase keberhasilan	Tingkat keberhasilan
86% - 100%	Sangat tinggi
71% - 85%	Tinggi
56% - 70%	Sedang
41% - 55%	Rendah
<40%	Sangat rendah

Results and Discussion

The application of the Project-Based Learning (PjBL) model to data processing materials showed a significant increase in the collaboration skills and creativity of 5th grade students of SD Muhammadiyah 4 Surabaya. Data obtained through observation instruments and questionnaires show the achievement of the following collaboration indicators:

Table 2. Results of Student Collaboration Skills Analysis

YES	COLLABORATION INDICATORS	PERCENTAGE (%)
1	Contribution in group discussions becomes	88,45%
2	Time management becomes	85,75%
3	Troubleshooting becomes	86, 50%
4	Work with friends	86,34
5	Research techniques	87,80%.

Data obtained through observation instruments and questionnaires showed that all indicators of collaboration skills were at a "Very High" success rate (range 86% - 100%). The details of the achievements of each indicator are as follows:

1. Contribution in Group Discussions (88.45%): This indicator obtained the highest percentage, indicating that students actively participated in sharing ideas and opinions during the planning process until project completion.

2. Investigation Techniques (87.80%): Students demonstrate excellent ability to conduct investigations, including conducting interviews and systematic data observation according to the project stages.
3. Problem Solving (86.50%): During the project, students were able to identify technical obstacles and find solutions together in a team, which proves the existence of a collective critical thinking process.
4. Working with Friends (86.34%): This percentage reflects the growth of empathy and the ability to work harmoniously between team members who have different backgrounds or abilities.
5. Time Management (85.75%): The group shows discipline in completing the project stages according to a pre-agreed schedule.

PjBL as a solution to the challenges of the digital era. The results of this study confirm that PjBL plays a crucial role in transforming the pattern of student interaction in digital schools. Before the intervention was carried out, the use of digital devices such as tablets tended to make students individualistic and more focused on *their respective gadgets*. However, through PjBL based on group investigation, the integration of digital devices is actually a catalyst that accelerates access to information and coordination between students.

Conclusion

This study concludes that the implementation of the Project-Based Learning (PjBL) model has a positive and significant effect on improving the collaboration skills of 5th grade students of SD Muhammadiyah 4 Surabaya in data processing materials. PjBL has proven to be able to transform individualistic interaction patterns in the digital era into a cooperative and innovative learning environment. This model is very relevant to be applied in the framework of the Independent Curriculum to form the character of Pancasila student profiles, especially in the dimensions of mutual cooperation and creativity.

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