



Development of a Project-Based Learning Model Using Science Games to Enhance Social Skills in Early Childhood

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Abstract

This study examines the effectiveness of project-based learning (PBL) using science-themed games in early childhood education. Through a qualitative research approach, the study explores how integrating science games within the PBL framework can enhance children's social skills. It identifies the importance of engaging children in science-themed projects to foster responsibility, cooperation, active participation, communication, sharing, and adaptability from an early age. By analyzing participants' responses and learning outcomes, the study highlights the potential benefits of this approach, including improved collaboration and adaptability skills among young children. The findings suggest that science-themed project-based learning enriches educational experiences and plays a crucial role in shaping socially skilled future generations.

Keywords: *PjBL Model, Science-based game, Social skills*

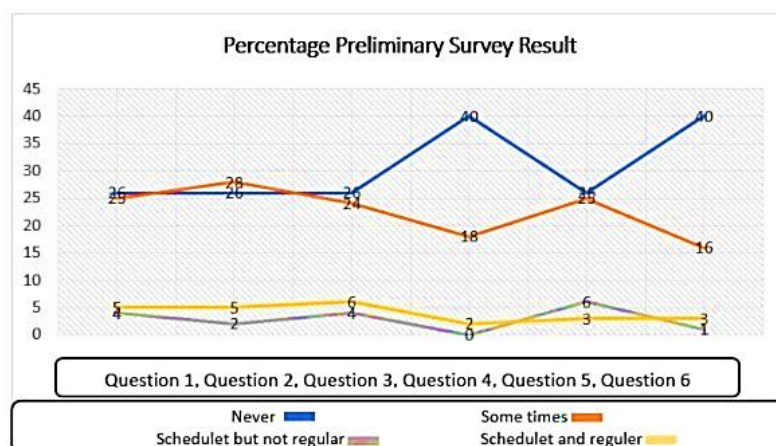
1. Introduction

Currently, the education system in Indonesia adopts the Merdeka Belajar Curriculum, which draws heavily from the 21st-century education concept. In this concept, students must master four essential skills: critical thinking, communication, collaboration, and creativity. Teachers play a vital role in assisting students to develop these skills, particularly communication and collaboration, as they are integral to early childhood social skills. Social skills are crucial for children's overall development, determining their future success and the ability to establish social relationships (Rohmawati, 2018; Nurjanah, 2022). Children with well-developed social skills are more likely to be accepted by their environment. Several studies highlight the importance of nurturing social skills from an early age. Research by Herman et al. (2023) indicates that children with good social skills are more readily accepted

by their peers, find it easier to cooperate, share, form cohesive teams, and exhibit high empathy levels. This aligns with Gregoriadis et al. (2013), who note that children with strong social skills can form relationships, enjoy collaborative activities, understand their friends' feelings, respect one another, and solve problems effectively. Conversely, research by Sari et al. (2016) suggests that children lacking social skills tend to be shy and face difficulties being accepted by their surroundings. A deficit in social skills can negatively impact intrapersonal skills, social abilities, and academic performance, leading to reduced self-confidence and self-esteem (Wayne & II, 2006; Salimi et al., 2021). Low social skills correlate with poor school performance, while high social skills are associated with better academic outcomes (Frogner et al., 2022). Lack of social skills can lead to problematic behaviors such as aggression, criminal tendencies, and academic failure (Özbey & Köyceğiz, 2020). Therefore, social skills are crucial for personal and professional development, helping individuals build better relationships (Gökel & Dağlı, 2017; Cosso et al., 2022). They are essential for living in multicultural societies and understanding others' needs (Riaskiana, 2019; Salimi & Fauziah, 2023).

Children trained in social skills have better opportunities to interact with peers, engage in group activities, complete group tasks, help others, and take responsibility (Dorten et al., 2022). Social skills training has proven effective in improving children's academic achievements (Domitrovich et al., 2017; Rusilowati & Wahyudi, 2020). It also reduces problematic behaviors and enhances peer relationships, making it a recommended intervention in public health services for children in vulnerable areas (Choe & Lee, 2015). Failure to develop effective social skills during early stages can lead to issues later (Takahashi et al., 2015). Based on previous research, the urgency of social skills development in early childhood is clear, focusing on learning to appreciate others in a multicultural society, effective communication, cooperation, sharing, and empathy.

Science Games in Social Skills Development Science games are a practical tool for teaching and applying social skills to children, offering variety and the ability to engage children effectively. These games are simple, easy, and attractive for young children to play. Early childhood science play activities develop various aspects of growth and potential (Hasbi & Wulandari, 2020). Emotional and social development can be nurtured through classroom games, with science games being an effective medium (Herliani & Mulyana,



2022). The benefits of science games for children include the development of sensory, physical, intellectual, emotional, spiritual, and social abilities (Mirawati & Nugraha, 2017). Science games can be modified to suit different contexts, making them enjoyable and engaging for children, particularly those aged 5-6 years. However, many teachers do not maximize available learning resources in schools or surrounding environments for science-based play to enhance children's social skills. Observations and interviews with teachers from three schools there are TK Negeri 01 Masbagik, TK PGRI Beriri Jarak, and TK Jannatul Ma'wa NW indicate that project-based science play models are rarely applied. The predominant teaching method is teacher-centered, with children often playing independently, leading to underdeveloped social skills.

This lack of social skill development manifests as children disturbing peers during lessons, fighting over toys, being difficult to manage, unwilling to tidy up toys, and not waiting their turn. Factors contributing to these issues include: (1) inadequate teacher understanding of project-based science play models, (2) teachers' inability to develop active learning projects, (3) infrequent use of science play media, (4) limited variety of games leading to boredom, and (5) ineffective classroom management.

Preliminary research involving questionnaires distributed to 60 early childhood education institutions in East Lombok supports these findings. Questions addressed teachers' understanding of project-based science play, whether schools had implemented specially designed activities, the availability of group-based science play media, and interest in using science play media for developing children's social skills.

The diagram illustrates that preliminary research findings indicate that early childhood education units (PAUD) in East Lombok, with 60 respondents, show varying levels of understanding among teachers regarding the project-based learning model using science play. Specifically, 43.3% of respondents still do not fully understand the project-based learning model using science play, 41.7% of respondents have a good understanding of this model, and 45.9% occasionally implement science play activities, although these are mostly individual activities. Furthermore, 43.3% of respondents have not yet designed project-based learning activities specifically using science play to enhance early childhood social skills. Regarding the use of science-based play with science boxes, 66.7% of respondents have never implemented this method. However, 66.7% of respondents agreed that the implementation of project-based learning using science play should be introduced in PAUD institutions. Factors contributing to these findings include limited time, innovation, and teachers' creativity in delivering science learning materials, which has led to the repetitive use of similar science concepts over the years and minimal use of educational play tools (APE) for science.

Based on the previously described needs analysis, it is necessary to develop a project-based learning model using science play to improve early childhood social skills, with the hope that this model can enhance the social skills of children aged 5-6 years in East Lombok.

2. Method

This study employs a qualitative research approach. The objective is to analyze project-based learning using science play with the theme of science games. The study was conducted over three months, involving PAUD principals and Group B teachers. Participants included principals, teachers, and Group B students, with informed consent obtained before data collection. For data analysis, the researchers coded the respondents as KS (principal), G (teacher), and PD (student). The rationale for this coding is as follows: 1) Principals have the authority to approve the operational curriculum in their educational units, and 2) Teachers and students serve as the compilers and executors of thematic marine education operationally in the teaching and learning process. Data collection utilized semi-structured interview instruments conducted with respondents for approximately 45 to 60 minutes. The interview guide was based on thematic learning theory. Eighteen questions were provided to principals and Group B teachers as participants. Documentation in the form of photos and videos of

teachers' learning activities was used as supporting data. Data analysis employed taxonomic analysis, wherein interview results and codes were categorized into project-based learning using science play (Creswell, 2014; Creswell & Creswell, 2018).

3. Results and Discussion

Project-based learning using science play with the theme of science games was implemented through three stages:

- a. **Pre-Development Activities:** Teachers introduced the objectives of the project activities, including the introduction of work concepts, fishermen's tasks, and tools used. The class was divided into workgroups to facilitate the project's execution.
- b. **Development Activities:** Teachers provided stimuli through questions about the theme and sub-themes of the project-based learning using science play, such as force and motion, texture and shape exploration, air, fire, water, and weather. Subsequently, children were invited to explore each sub-theme during the sessions.
- c. **Evaluation and Conclusion:** Evaluation and closing activities were conducted to reflect on the learning process and the outcomes achieved through the project-based learning using science play.

Upon completion of the project, the children and teachers organized the tools used, cleaned the work area, and engaged in concluding activities such as decorating letters with an ocean theme. Collaborators and children actively participated in science play-based project learning activities, which included:

- a. Students were encouraged to actively participate in project groups focusing on science play themes.
- b. Participants were actively engaged in science play-based project learning across each sub-theme.
- c. Participants shared roles within groups to complete the science box play at various levels.
- d. Participants actively participated and collaborated in completing science projects like creating rainbows.
- e. Participants worked together in groups to complete the science project of making birthday cakes.

- a. Some participants interacted with their group mates while working on science projects.
- b. Participants collaborated in groups to blow as many soap bubbles as possible.
- c. Some participants demonstrated responsibility in completing science play-based projects.

Overall, the study participants were involved in various science play-themed project learning experiences aimed at enhancing early childhood social skills. Multiple studies have explored the effectiveness of science learning for early childhood social skills. Kusadi et al. (2020) noted that project-based learning models can (1) simultaneously affect students' social skills and creative thinking abilities, (2) have a significant impact on students' social skills. Stojanović et al. (2023) stated that project learning can develop all aspects of child development. Project-based learning benefits preschool children and teachers, significantly impacting early childhood's social and geographical environment awareness (Setyowati, 2023). Project-based learning strategies are the most commonly used in group and peer learning (Sagala & Motlan, 2019; Lobczowski et al., 2021). Project-based learning engages children in all activities, making them actively learn through play. Several studies show that project-based learning positively influences the development of children's social skills. The project-based learning approach fosters collaboration among children and offers meaningful learning experiences across educational levels (Farida, 2019).

Collectively, these studies suggest that science play-based project learning can be effective but may require careful planning and integration with other learning activities. Utilizing qualitative research methods, this study focuses on a child-centered approach that meets children's needs and interests. The study highlights the importance of implementing science play-based project learning to enhance children's social skills from an early age. According to Herliani and Mulyana (2022), socio-emotional development can be fostered through classroom play, particularly science play. Science play benefits children by developing sensory, physical, intellectual, emotional, spiritual, and social abilities (Mirawati & Nugraha, 2017). Science play can be modified in various versions depending on how teachers adapt it to be easy, fun, and engaging for children, especially those aged 5-6 years. These studies collectively affirm that science play can train children's social skills aspects:

- a. Gelisli and Yazici (2015) found that in Konya, Turkey, the implementation of 60 types of play models supported motor, social-emotional development by 26.6%, language development by 23.3%, cognitive development by 18.3%, and self-care by 0.5%.
- b. Tersi & Matsouka (2020) from Democritus University of Thrace showed that structured play activity programs positively impacted preschool children's social behaviors.
- c. Gasso (2005) defined play as an area for testing, training, exploring, experimenting, and interacting with others and objects played by children (Lucas, 2017). Based on these research findings, it can be concluded that various play activities are crucial for stimulating every aspect of child development, particularly their social development.
- d. Sagala et al. (2021) stated that project-based learning strategies are the most common in group and peer learning.

4. Conclusion

The study titled "Development of a Project-Based Learning Model for Early Childhood Social Skills Through Science Play" concludes that project-based learning (PBL) with a science play theme effectively involves children in group science play-based project learning activities. The study emphasizes a child-centered approach, collaboration, participation, communication, and teamwork in completing science play-based project learning. Through qualitative methods, this study demonstrates how integrating science themes in early childhood education enhances social skills such as cooperation, communication, participation, sharing, and adapting to group rules.

The study's implications indicate that integrating PBL with science content can enhance early childhood social skills. This approach offers a way to introduce science play concepts through group cooperation, though this study has limitations, such as the qualitative approach's scope, which may not fully capture various aspects of children's social skills in science play-based project learning activities. Further research is recommended to explore the long-term effects of project-based learning and its application in various multidisciplinary and interdisciplinary contexts.

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