Jurnal Pendidikan Dasar Nusantara Vol 10, No 2, January 2025
ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Building Students' Social Emotional Character Phase A Through Project P5 Using Alternative Planting Media

Submitted:
January 03, 2025
Accepted:
January 11, 2025
Published:
January 17, 2025

Gancar Pramistri Ambawono [1], Setiti Rahayuningsih [2], Daroe Iswatiningsih [3], Yudistira Fardana [4], Niswatun Khasanah [5], ambawonogancar@gmail.com [1], setitiyuyun@gmail.com [2], iswatiningsihdaroe@gmail.com [3] , yudistirafardana@gmail.com [4], marisa.ruhdina@gmail.com [5]
Magister Pedagogi, FKIP, Universitas Muhammadiyah Malang [1,2,3,4,5]

Abstract: This study aims to measure the impact of planting activities using alternative planting media on the development of social-emotional character of Phase A students at SD Muhammadiyah 4 Malang City. The study used a quantitative approach with a quasi-experimental design. The research sample consisted of 130 grade 1 elementary school students involved in project-based activities. The research instruments in the form of questionnaires and structured observations were used to measure the development of aspects of cooperation, creativity, responsibility, and empathy. The results of the analysis showed that 5 students were in the "starting to develop" category, 30 students were in the "developing" category, and 95 students were in the "very developed" category. These findings indicate that project-based activities that utilize alternative planting media such as hydroton and hydrogel are effective in improving students' social-emotional character. This study emphasizes the importance of project-based learning in building students' character holistically.

Keywords: Social-Emotional Character, Planting Media, Project-Based Learning

PRELIMINARY

Basic education is an important foundation in the formation of character and social-emotional abilities of students, especially in Phase A, which includes the age of children in grade 1 of elementary school. At this stage, children are in a critical phase of development, where moral, social, and emotional values begin to form significantly. Childhood is a very important period for instilling self-confidence, responsibility, and interpersonal skills (Khatimah, Kartika, & Santika, 2022). In this case, education that integrates practical experience with the teaching of moral values is very much needed.

The Pancasila Student Profile Strengthening Project (P5) is one of the innovative approaches in the Merdeka Curriculum designed to meet this need (Yuzianah, Budi Darmono, Supriyono, & Kurniawan, 2023). P5 emphasizes project-based learning that aims to build student character through direct experiences that are relevant to everyday life. According to (Web Manager of the Ministry of Education and Culture of the

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Republic of Indonesia, 2021), P5 is oriented towards six main dimensions of the Pancasila Student Profile, namely: faith, devotion to God Almighty, and noble character; global diversity; mutual cooperation; independence; critical thinking; and creativity. These dimensions form a framework for creating a young generation that excels in character and competence (Ulandari & Rapita, 2023).

In this context, SD Muhammadiyah 4 Malang City has implemented P5 through a planting project using alternative planting media, such as hydroton, hydrogel, cocopit, and burnt rice husks. Alternative planting media are not only environmentally friendly but also provide STEM (Science, Technology, Engineering, and Mathematics)-based learning experiences (Oktaviani, Anom, & Lesmini, 2020). This is in accordance with Bloom and Anderson's taxonomy which states that experience-based learning encourages students to think critically and solve problems creatively (Siagian, 2021). The use of this planting medium also contributes to the introduction of the concept of sustainability to students from an early age, as stated by Goleman, that education that instills environmental awareness supports the development of a more responsible generation (Sudrajat & Wijayanti, 2019).

However, basic education in Indonesia still faces major challenges in building students' social-emotional character. Most approaches tend to focus on the cognitive aspect, thus ignoring the development of character values (Azzam et al., 2023). This can be seen from the low ability of students to work together, resolve conflicts, and appreciate differences of opinion in a social context. The planting project with alternative planting media at SD Muhammadiyah 4 Malang City was designed to address this problem. By involving students in group activities, this project provides space for them to learn to work together, share responsibilities, and understand the importance of environmental sustainability. Social-emotional skills, such as empathy and cooperation, can be developed through direct interaction in group activities. In addition, project-based activities also teach the values of mutual cooperation which are important in community life. (Widiastuti, 2022)

In dealing with these problems, the implementation of P5 offers an innovative and practical approach. Through planting activities with alternative planting media, students are invited to learn directly about the plant growth process, the importance of caring for the environment, and the values of cooperation. Hydroton, hydrogel, cocopit, and burnt

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

rice husks as alternative planting media not only attract students' attention but also introduce them to the concept of sustainability. The use of organic planting media such as cocopit and burnt rice husks not only enriches environmental learning but also teaches the value of recycling (Purwaningsih, Munawar, & Prasetiyawati Dyah Hariyanti, 2022). This learning process also utilizes group work as a strategy to develop the dimension of mutual cooperation in the Pancasila Student Profile. Project-based learning can improve students' ability to collaborate and respect differences (Yuzianah et al., 2023). In addition, the use of easily accessible alternative planting media allows schools to adopt this program without requiring large costs. The application of planting media such as hydrogel, which can absorb water up to several times its weight, provides lessons on water resource efficiency, which is an important issue in global sustainability (Fakhriyah, Yeyendra, & Marianti, 2021).

Social-emotional is an individual's ability to understand and manage emotions, and establish healthy relationships with others. Emotional intelligence includes five main aspects, namely self-awareness, self-management, motivation, empathy, and social skills (Emiliana, Nugraha, & Susilawati, 2022). In the context of education, the development of social-emotional character helps students to become independent, responsible individuals who are able to work together with others (Syamsul Hadi, 2013). Project-based learning, as implemented in P5, offers an ideal framework for developing social-emotional character. Project-based learning can encourage students to engage in real activities that are relevant to their lives (Azzam et al., 2023). In addition, project-based learning allows students to practice moral and social values in situations that support interpersonal interaction.

Alternative planting media, such as hydroton and hydrogel, also play an important role in this learning. Hydroton, which is made from clay, has a porous structure that allows good air and water circulation, thus supporting plant growth. Hydrogel, as a polymer that can absorb water, helps students understand the concept of resource efficiency (Tambing, Somba, & Nazara, 2023). Cocopit and burnt rice husks, which are organic materials, teach students about the importance of recycling and environmental sustainability (Missdiani, Lusmaniar, & Musmulyono, 2019). In a previous study, it was found that student involvement in collaborative activities improved their social-emotional skills, including the ability to empathize and communicate effectively (Musafir, Mulyono, & Hamdani,

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

2023). These findings support the P5 approach, which integrates collaborative activities into every stage of learning. In addition, this study also shows that project-based learning increases student engagement emotionally and intellectually, thereby creating an inclusive learning environment.

The implementation of this approach at SD Muhammadiyah 4 Malang City shows that project-based activities can improve students' creativity. Creativity is part of multiple intelligences that can be honed through direct experience (Ardiana, 2022). In this context, students are given the opportunity to choose appropriate planting media and design their plant care strategies, thereby strengthening critical and innovative thinking skills. The purpose of this approach is to build students' social-emotional character by emphasizing the importance of skills such as cooperation, creativity, responsibility, and empathy. This approach is relevant to the demands of 21st-century education which requires critical thinking skills, creativity, and collaboration (Zubaidah, 2016). In addition, emotional intelligence, which includes empathy and social skills, plays an important role in individual success (Karomah & Widiyono, 2022). The benefits of this approach include improved critical thinking skills, the ability to work together in groups, and higher environmental awareness. Furthermore, this activity also contributes to sustainable education by teaching students to understand the importance of protecting the environment and managing resources wisely. Thus, students are expected to not only excel academically but also have a strong character and care about environmental sustainability.

METHOD

This study uses a quantitative method with a quasi-experimental design to evaluate the effect of planting activities using alternative planting media on students' social-emotional character. The research sample involved 130 grade 1 students of Muhammadiyah 4 Elementary School, Malang City. This design includes measurements before (pre-test) and after (post-test) activities to analyze changes in students' social-emotional aspects. The quantitative approach was chosen because it allows for objective and measurable data collection in assessing the relationship between independent variables (planting activities with alternative planting media) and dependent variables (students' social-emotional character). This method provides a systematic framework for

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

evaluating educational phenomena quantitatively (Creswell, 2019). This study uses a quasi-experimental design, involving control and experimental groups, to compare the effectiveness of the learning approaches applied. The procedures for this research are:

1. The Planning Stage which consists of, a) Identifying alternative planting media: hydroton, hydrogel, cocopit, and burnt rice husks, b) Designing research instruments, such as Likert-based questionnaires to measure social-emotional dimensions, c) Determining the experimental group that follows planting activities and the control group that uses conventional learning methods.
2. Implementation Stage which consists of, a) Pre-test: Conducted to measure the initial conditions of students in both groups, b) Activity Implementation: The experimental group carried out planting activities with alternative planting media for 10 weeks, while the control group continued to undergo conventional learning, c) Post-test: Conducted to evaluate changes in both groups.
3. Data Collection which consists of, a) Quantitative data were collected using questionnaires and structured observation sheets, b) Visual documentation was used to complement the quantitative data and provide additional validation of the findings

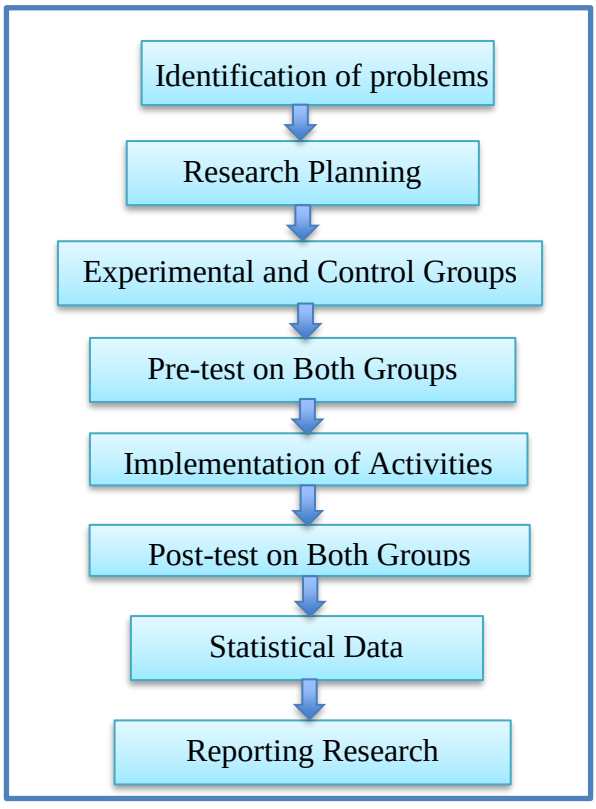

Figure 1: Research Flowchart

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Data Analysis Techniques

Data were analyzed using descriptive and inferential statistical approaches:

1. Descriptive Statistics:

a. Calculate the average value, standard deviation, and frequency distribution to describe the pre-test and post-test data.

b. Present the data in the form of tables and graphs to facilitate interpretation.

2. Normality and Homogeneity Test:

a. a. Shapiro-Wilk test is used to ensure that the data is normally distributed. Levene's test is used to check the equality of variance between the experimental and control groups.

3. Inferential Test:

a. The paired t-test is used to evaluate changes in the experimental group.

b. The independent t-test is used to compare results between the experimental and control groups.

Statistical Formula

1. Average (Mean):

$$\bar{x} = \frac{\sum x}{n}$$

$\bar{X}$: Average
$\sum X$: Total amount of data
n : Amount of data
Where $\bar{X}$ is the mean, $\sum$ X is the total number of scores, and n is the number of data.

2. t-Test for Paired Samples:

$$t = \frac{\bar{x}_d}{s_d / \sqrt{n}}$$

t: T-value
$\bar{X}_d$: Average score difference
s_d: Standard deviation of differences
n: Number of samples

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Standard deviation of differences (s_d):

$$Sd = \sqrt{\frac{\sum(d - \bar{x}d)^2}{n - 1}}$$

d: Difference between pre-test and post-test scores

Where $\bar{X}$d is the mean difference, sd is the standard deviation of the differences, and n is the number of pairs.

3. t-Test for Unpaired Samples:

$$t = \frac{\overline{x_1} - \bar{x}_2}{\sqrt{\frac{s_1^2}{n} + \frac{s_2^2}{n_2}}}$$

t: T-value

$\bar{X}_1$, $\bar{X}_2$: Average of groups 1 and 2

s_1^2 , s_2^2: Variance of groups 1 and 2

n_1 , n_2: Number of samples for groups 1 and 2

Variance(s^2):

$$S^2 = \frac{\sum(x - x)^2}{n - 1}$$

X: Individual Data

$\bar{X}$: Group average

Where $\bar{X}$1, $\bar{X}$2 are the group means, are the standard deviations, and n1, n2 are the number of samples in each group. With this procedure, this study is expected to provide an accurate and objective picture of the effectiveness of project-based activities in developing students' social-emotional character.

Research Stages and Analysis

1. Variable Identification:

a. Independent Variable: Planting activities with alternative planting media.

b. Dependent Variable: Students' social-emotional character, including cooperation, creativity, responsibility, and empathy.

2. Data Collection:

a. Conducting a pre-test to measure students' initial conditions.

b. Observing student interactions during planting activities.

c. Conducting a post-test to evaluate the results of the activity.

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

3. Data Analysis:

a. Comparing pre-test and post-test scores in the experimental group.

b. Testing for significant differences between the experimental and control groups.

4. Reporting Results:

a. Arrange data in the form of tables and graphs.

b. Analyze findings by referring to relevant literature.

c. Analyze findings by referring to relevant literature.

Tabel Rencana Pengumpulan Data

Research Stage	Activity	Instrument	Output	Information
Planning	Preparation of research instruments	Likert scale questionnaire	Ready-to-use instruments	Assessing students' social-emotional aspects (Cooperation, Creativity, Responsibility, Empathy)
	Identification of alternative planting media	Planning document	Final activity plan	Hydroton, Hydrogel, Cocopit, Burnt Rice Husk
	Preparation of project activity guidelines	Activity guide	Ready-to-use guidebook	Instructions for implementing planting activities
Implementation	Pre-test	Likert scale questionnaire	Student initial scores	Measuring the initial condition of student character
	Implementasi kegiatan menanam	Structured observation	Student interaction data	Activities for 10 weeks
	Dokumentasi kegiatan	Photo/Video	Visual evidence of activity	Documentation of group activities
	Supervisi guru	Supervision notes	Supervision reports	Ensuring student involvement
Data collection	Student observation during activities	Observation sheet	Student behavior notes	Observation of student interactions
	Teacher and student interviews	Interview guide	Additional insights	Confirmation of observation results
	Post-test	Likert scale questionnaire	Student final scores	Measuring student character development
	Student reflection	Reflection journal	Student reflection notes	Student perceptions of activities
Data analysis	Statistical analysis (t-test)	Data pre-test & post-test	Significant results (p-value)	Test for differences between control and experimental groups
	Qualitative analysis	Observation notes	Qualitative findings	Analysis of non-numerical data
Reporting Results	Preparation of research report	Research report	Research findings	Conclusions and recommendations
	Presentation of research results	Presentation slides	Summary of results	Presented to stakeholders
	Preparation of recommendations	Recommendation document	Implementation guide	Suggestions for schools and teachers

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

The planning stage begins with the preparation of an activity guide that aims to ensure that teachers and students have a clear understanding of each step that must be taken in planting activities. This involves a detailed explanation of the planting process, from material preparation, planting techniques, to plant care. In addition, the identification of planting media focuses on the selection of materials that are not only easily accessible, but also environmentally friendly, such as the use of pots made from recycled materials or organic planting media that support environmental sustainability.

At the implementation stage, the activity begins with a pre-test to measure students' initial abilities related to the knowledge and skills they have before carrying out planting activities. This aims to provide an overview of students' understanding before they receive intervention in the form of practical learning. Documentation of activities is very important to ensure that each step in the activity is recorded properly, so that the results and processes can be evaluated comprehensively. Teacher supervision also plays an important role in ensuring that activities run according to plan and students are actively involved. Teachers are tasked with providing guidance and support so that students can follow each stage of the activity properly.

At the data collection stage, interviews with teachers and students were conducted to explore further information regarding the challenges and successes they experienced during the activity. This interview also provided an opportunity for teachers and students to express their views regarding the implementation of planting activities. In addition, student reflections are conducted to explore their personal understanding and experiences in participating in planting activities. This reflection process can reveal the extent to which students can connect theory with practice and how they feel about the learning process.

At the data analysis stage, two approaches are used to obtain a more complete picture. Statistical analysis provides quantitative data that can show the effectiveness of activities, such as increased student knowledge or skills after participating in planting activities. Meanwhile, qualitative analysis provides deeper insight from the results of student observations and reflections, as well as interviews that can reveal their feelings and perceptions of the activities. With these two approaches, a more comprehensive picture can be obtained regarding the impact of activities on students.

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Finally, at the reporting stage, all collected data will be reported systematically in the form of an official document that includes the main findings of the study, both in quantitative and qualitative forms. The results of this study will be structured so that they are easily understood by interested parties, including teachers, principals, and other parties involved in curriculum development. Recommendations prepared based on the results of this study can be an implementation guide for other schools interested in adopting similar methods in practical activity-based learning, such as planting activities. These recommendations can include tips on the right materials, effective techniques, and ways to increase student engagement. The following graph is included showing a comparison of the average pre-test and post-test scores on the dimensions of cooperation, creativity, responsibility, and empathy between the control group and the experimental group.

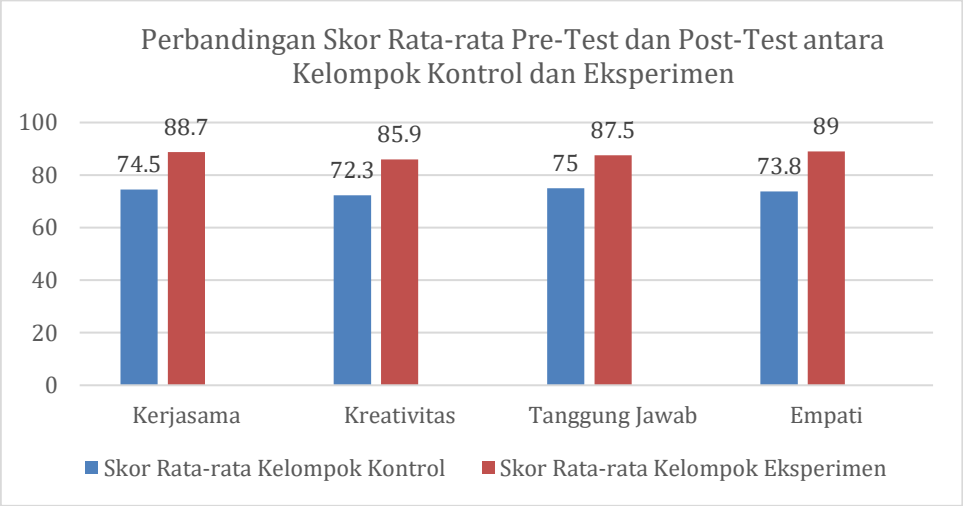

Figure 2 :
Comparison Chart of Average Scores of Pre-test and Post-test between control and experimental groups

The graph above shows a comparison of the average scores of the social-emotional character dimensions between the control group and the experimental group after planting activities with alternative planting media were carried out. There are four aspects measured, namely Cooperation, Creativity, Responsibility, and Empathy. The results of the study showed that the experimental group experienced a much more significant increase compared to the control group in each of these dimensions. In the Cooperation dimension, the experimental group achieved an average score of 88.7, while

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

the control group only obtained 74.5. This indicates that project-based activities allow students to work together more actively in completing group assignments. Meanwhile, the Creativity dimension also experienced a significant increase, where the experimental group recorded a score of 85.9 compared to the control group which only achieved 72.3. This shows that learning methods that involve direct experience can stimulate students to think creatively and innovatively in facing challenges. In addition, the Responsibility dimension showed a similar trend, with the experimental group's score reaching 87.5, far above the control group's score of 75.0. Routine activities in caring for plants seem to have succeeded in building students' sense of responsibility for the tasks given.

In the Empathy dimension, the difference was also very striking, with the experimental group scoring 89.0 compared to the control group which only achieved 73.8. These results confirm that active interaction in groups can increase students' sensitivity to the feelings and needs of their friends. Overall, these results show the effectiveness of planting activities using alternative planting media in developing students' social-emotional character. The project-based learning process not only provides meaningful practical experience but also encourages the development of important values such as cooperation, creativity, responsibility, and empathy. These findings are in line with research (Samsuri & Firdaus, 2017) which emphasizes the importance of interaction in cooperative learning to improve social skills. In addition, an environment that stimulates free exploration can facilitate the development of creativity and a sense of responsibility in students. Therefore, a similar approach is expected to be adopted more widely in the school curriculum to ensure a more holistic and sustainable development of student character.

RESULTS

This study revealed that planting activities using alternative planting media significantly improved students' social-emotional character. In the experimental group, the average pre-test score increased from 74.3 to 88.2 in the post-test, while the control group only increased from 73.1 to 75.4. The paired t-test analysis for the experimental group showed a value of $t = 11.45$; $p < 0.05$ $t = 11.45$; $p < 0.05$ $t = 11.45$; $p < 0.05$, indicating a significant change after the intervention. In contrast, the control group did not show a significant change ($t = 1.23$; $p > 0.05$ $t = 1.23$; $p > 0.05$ $t = 1.23$; $p > 0.05$). The

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

four main dimensions analyzed, namely cooperation, creativity, responsibility, and empathy, showed different results between the experimental and control groups. The experimental group experienced a much greater increase than the control group. These data are shown in Table 1.

Table 1. Comparison of Average Scores of Pre-test and Post-test

Dimensions	Control Group	Experimental Group
Collaboration	74,5	88,7
Creativity	72,3	85,9
Responsibility	75,0	87,5
Empathy	73,8	89,0

In addition, the observation results showed that students in the experimental group were more often involved in active discussions, shared responsibilities, and showed initiative during planting activities. The results of this study indicate that project-based activities with alternative planting media contribute positively to students' social-emotional development. The main benefit is that students not only learn the value of cooperation, but also apply these values in real practice through the division of tasks and group responsibilities. Collaborative learning can strengthen social skills through intensive interaction. Increasing creativity in the experimental group is also an important point in this study. Activities involving hydrogel, cocopit, and burnt rice husks motivate students to innovate in caring for plants. Creativity develops better in an environment that supports free exploration and practical problem solving, as applied in this study. The responsibility dimension showed a significant increase in the experimental group. This can be explained by the nature of the activity that requires students to care for plants routinely and report the results. Activities that require sustainability can increase students' sense of responsibility.

Increased empathy can be seen from the way students in the experimental group support their friends who have difficulty caring for plants. Experience-based activities, especially in a group environment, can encourage the development of empathy through close social interaction. The benefits of this research are not only relevant to the context of formal education, but also have implications for the development of project-based curriculum. Teachers can use alternative planting media to create interesting, relevant, and meaningful learning experiences. In addition, the use of planting media such as hydrogel also provides insight into resource efficiency, which is relevant to global

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

sustainability issues. Project-based learning significantly improves students' critical thinking and collaboration skills. Environmental-based projects are only effective for students with high initial interest in nature. In this study, even students with low initial interest showed high engagement after being given interesting practical experiences. Overall, this study provides evidence that project-based activities with alternative planting media are effective in improving students' social-emotional character. This activity not only improves aspects of cooperation and creativity, but also helps students develop empathy and responsibility. The practical implication of this study is that schools can use a similar approach to build students' character holistically.

DISCUSSION

This study uses a quantitative method with a quasi-experimental design to evaluate the impact of planting activities using alternative planting media on the development of social-emotional character of Phase A students at SD Muhammadiyah 4 Malang City. The quantitative approach can be chosen because of its ability to collect data objectively and measurably, and provide a clearer understanding of the relationship between independent variables and dependent variables (Prof. Dr. H. M. Sidik Priadana & Denok Sunarsi, S.Pd., M.M., 2021). The independent variables in this study are planting activities using alternative planting media such as hydroton, hydrogel, cocopit, and burnt rice husks, while the dependent variable is the students' social-emotional character which includes four main aspects, namely cooperation, creativity, responsibility, and empathy. The sample of this study involved 130 grade 1 elementary school students who were divided into two groups: the experimental group who participated in planting activities with alternative planting media and the control group who applied conventional learning methods. This study involved measurements before and after activities to see the development of students' social-emotional character.

The research instruments used included a Likert-based questionnaire, structured observation sheets, and visual documentation in the form of photos and videos. The questionnaire was designed to measure the development of aspects of student cooperation, creativity, responsibility, and empathy. Observations were conducted to monitor how students interact, work together, and show concern during the activity. Visual documentation complements quantitative data by providing concrete evidence of

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

student activities during the planting process. Data analysis was carried out using descriptive and inferential statistical methods. Descriptive statistics were used to calculate the mean value, standard deviation, and frequency distribution of the pre-test and post-test results.

The Shapiro-Wilk normality test was used to ensure normal data distribution, while the Levene homogeneity test was conducted to check the equality of variance between the experimental and control groups. Furthermore, the t-test for paired samples (paired t-test) was used to measure significant differences in the experimental group before and after the activity, while the t-test for unpaired samples (independent t-test) was used to compare the results between the experimental and control groups. The results of the analysis showed a significant increase in all dimensions of social-emotional character in the experimental group compared to the control group. In the cooperation dimension, the experimental group achieved an average score of 88.7, while the control group only achieved 74.5. This shows that planting activities improve students' ability to work together, share responsibilities, and help each other.

Figure 3: Social-Emotional Development Children work together in groups

In the creativity dimension, the experimental group recorded an average score of 85.9, higher than the control group which only achieved 72.3. These results indicate that the project-based method with alternative planting media provides students with space to think creatively and find solutions in caring for plants. According to Musafir, Mulyono, and Hamdani (2023), planting activities can stimulate students' creativity through direct exploration in the process of plant growth and development. Activities such as choosing planting media, monitoring plant development, and solving problems that arise in the process of caring for plants provide students with real experience in creative and innovative thinking.

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

In the responsibility dimension, the experimental group achieved an average score of 87.5, while the control group only achieved 75.0. Routine activities such as watering plants and monitoring their progress help students develop a sense of responsibility. Furthermore, the empathy dimension also experienced a significant increase, with the experimental group achieving an average score of 89.0 compared to the control group which only scored 73.8. Interaction in groups helps students become more sensitive to the needs and feelings of their friends.

Figure 4: Environmental Awareness Children weeding plants

Paired t-test analysis for the experimental group showed a t-value of 11.45 with a p-value <0.05, indicating a significant difference between the pre-test and post-test scores in the group. In contrast, the control group did not show any significant changes with a t-value of 1.23 and a p-value >0.05. This finding proves that interaction in collaborative activities can improve students' social skills. A learning environment that supports exploration and innovation helps stimulate students' creativity.

Figure 5: Creativity and Independence Children independently care for plants

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

The use of alternative planting media such as hydroton and hydrogel plays an important role in creating an interesting and effective learning experience (Tambing et al., 2023). Hydroton, with its porous structure that is good for air and water circulation, and hydrogel that can store large amounts of water, helps students understand the concept of natural resource efficiency. The implications of this study confirm that a project-based approach with alternative planting media can be an effective strategy for developing students' social-emotional character in elementary schools. Teachers play a key role in facilitating these activities so that students can learn actively and meaningfully. Although this study has limitations, such as limited sample coverage and relatively short duration of activities, the results still provide valuable contributions to the field of elementary education. Further research with a wider scope and longer period is expected to strengthen these findings. Thus, planting activities using alternative planting media can be integrated into the curriculum as an effective method for building strong, creative, and responsible student character in the era of modern education.

CONCLUSION

This study shows that planting activities using alternative planting media such as hydroton, hydrogel, cocopit, and burnt rice husks have a positive and significant impact on the development of students' social-emotional character. Through a project-based learning approach integrated into the curriculum, students can develop cooperation skills, creativity, responsibility, and empathy more effectively. The development of emotional intelligence at an early age provides a strong foundation for future success.

Planting activities with alternative media provide practical experiences that allow students to be directly involved in the learning process. This experience helps students understand the importance of responsibility in caring for plants and working together in groups to achieve common goals. Cooperative learning improves interpersonal skills and empathy, which are very important in everyday social interactions. Furthermore, planting activities also contribute to the development of students' creativity. Creativity develops optimally when students are given the freedom to explore new ideas and face practical challenges. The use of planting media such as hydrogel which is able to store water well also teaches students about resource efficiency, which is relevant to global sustainability issues (Tambing et al., 2023).

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

This study also emphasizes the importance of a project-based approach in elementary education. This approach focuses not only on academic outcomes but also on holistic character development. Project-based learning increases student engagement and helps them understand the context of learning in real life. In this case, planting activities using alternative planting media provide opportunities for students to understand environmental and sustainability concepts from an early age. The results of this study are also consistent with the findings, which state that social interaction in project-based activities can improve students' empathy and communication skills. This can be seen from the way students work together, share responsibilities, and help each other during planting activities. In addition, the development of a sense of responsibility can also be seen from students' awareness in caring for plants regularly. The practical implications of this study are very clear. Schools can adopt planting activities using alternative planting media as part of a project-based curriculum to develop students' character effectively. Teachers have an important role in facilitating this activity, ensuring that each student is actively involved, and creating an environment that supports collaboration and creativity. However, this study also has limitations, such as the limited sample coverage in one school and the relatively short duration of the intervention. Further research with a wider sample and a longer intervention period is expected to provide deeper insights into the effectiveness of this approach. Overall, the results of this study support the importance of implementing project-based learning with alternative planting media as an effective method for developing students' social-emotional character. By combining theoretical and practical aspects, this approach not only improves students' academic skills but also forms strong, empathetic, and responsible characters. Therefore, schools and education policy makers need to consider integrating this approach into the curriculum more broadly to achieve holistic and sustainable educational goals.

REFERENCES

Ardiana, R. (2022). Pembelajaran Berbasis Kecerdasan Majemuk dalam Pendidikan Anak Usia Dini. *Murhum : Jurnal Pendidikan Anak Usia Dini*. https://doi.org/10.37985/murhum.v3i1.65

Azzam, M., Farychi, R. Al, Siregar, R. K. S., Anugrah, N. S., Atmaja, R. I., Farsi, A., Manik, S., & Nurkadri, N. (2023). Pengaruh Sistem Pembelajaran Terhadap Tingkat Prestasi Siswa Di MAN 2 Model Medan. *Innovative: Journal Of Social*

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Science Research, *3*(2).

Creswell, J. W. (2019). Pendekatan Metode Kualitatif, Kuantitatif, dan Campuran (Terjemahan). In *Jakarta: Pustaka Pelajar*.

Emiliana, E., Nugraha, A. E., & Susilawati, I. (2022). Kecerdasan Emosional Menurut Goleman Dalam Perspektif Kurikulum 2013 Paud. *Masa Keemasan: Jurnal Pendidikan Anak Usia Dini*, *1*(2). https://doi.org/10.46368/.v1i2.800

Fakhriyah, Yeyendra, & Marianti, A. (2021). Integrasi Smart Water Management Berbasis Kearifan Lokal Sebagai Upaya Konservasi Sumber Daya Air di Indonesia. *Indonesian Journal of Conservation*, *10*(1).

Khatimah, H., Kartika, I. M., & Santika, I. G. N. (2022). Pengaruh Implementasi Pendidikan Karakter Terhadap Sikap Sosial Pada Siswa. *Widya Accarya*, *13*(2). https://doi.org/10.46650/wa.13.2.1266.127-132

Missdiani, M., Lusmaniar, L., & Musmulyono, M. (2019). Pengaruh Media Tanam Dan Pemberian Nutrisi Terhadap Pertumbuhan Dan Produksi Tanaman Sawi (Brassica Juncea L.) Pada Teknik Budidaya Hidroponik. *Agronitas*, *1*(2). https://doi.org/10.51517/ags.v1i2.125

Musafir, M., Mulyono, A., & Hamdani, M. (2023). Meningkatkan Kemampuan Sosial Emosional Anak Kelompok B Melalui Kegiatan Menanam Biji Kacang Hijau Di Paud Al-Hamzar Lokok Aur. *Jurnal Ilmiah Mandala Education*, *9*(1). https://doi.org/10.58258/jime.v9i1.4791

Oktaviani, A., Anom, K., & Lesmini, B. (2020). Pengembangan Modul Kimia terintegrasi STEM (Science, Technology, Engineering and Mathematics) dan PBL (Problem-Based Learning). *Journal of Educational Chemistry (JEC)*, *2*(2). https://doi.org/10.21580/jec.2020.2.2.6279

Pengelola Web Kemdikbud RI. (2021). Kemendikbud Sampaikan Capaian Tahun 2020 dan Sasaran Tahun 2021. In *Http://Kemdikbud.Go.Id/* (Vol. 57946100, Issue Mei).

Purwaningsih, P., Munawar, M., & Prasetiyawati Dyah Hariyanti, D. (2022). Analisis Pembelajaran Lingkungan Sosial Berbasis STEAM pada Anak Usia Dini. *Murhum : Jurnal Pendidikan Anak Usia Dini*. https://doi.org/10.37985/murhum.v3i1.68

Samsuri, T., & Firdaus, L. (2017). Pengaruh Pembelajarn Kooperatif Student Teams Achivement Division (STAD) Terhadap Keteramilan Berpikir Kritis Siswa. *Prisma Sains : Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, *5*(1). https://doi.org/10.33394/j-ps.v5i1.1110

Siagian, R. (2021). Pembelajaran Berbasis Proyek Pada Pokok Bahasan Bahan Alam Untuk Meningkatkan Kreativitas Siswa Kelas VIII SMP Negeri 1 Sigumpar. *Journal of Applied Technology and Informatics Indonesia*, *1*(2). https://doi.org/10.54074/jati.v1i2.39

Sudrajat, M. A., & Wijayanti, E. (2019). Analisis Prediksi Kebangkrutan (Financial Distress) Dengan Perbandingan Model Altman, Zmijewski Dan Grover. *Inventory: Jurnal Akuntansi*, *3*(2). https://doi.org/10.25273/inventory.v3i2.5240

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v10i2.24530

Syamsul Hadi, S. H. (2013). Pembelajaran Sosial Emosional Sebagai Dasar Pendidikan Karakter Anak Usia Dini. *Jurnal Teknodik*. https://doi.org/10.32550/teknodik.v0i0.104

Tambing, Y., Somba, B. E., & Nazara, W. (2023). Pengaruh Berbagai Dosis Hidrogel dan Frekuensi Penyiraman Terhadap Pertumbuhan dan Hasil Tanaman Bawang Merah (Allium ascalonicum L.) pada Sistem Vertikultur. *Agroland: Jurnal Ilmu-Ilmu Pertanian*, *30*(2). https://doi.org/10.22487/agrolandnasional.v30i2.1718

Ulandari, S., & Rapita, D. D. (2023). Implementasi Proyek Penguatan Profil Pelajar Pancasila sebagai Upaya Menguatkan Karakter Peserta Didik. *Jurnal Moral Kemasyarakatan*, *8*(2). https://doi.org/10.21067/jmk.v8i2.8309

Widiastuti, S. (2022). Pembelajaran Sosial Emosional dalam Domain Pendidikan: Implementasi dan Asesmen. *JUPE : Jurnal Pendidikan Mandala*, *7*(4). https://doi.org/10.58258/jupe.v7i4.4427

Yuzianah, D., Budi Darmono, P., Supriyono, S., & Kurniawan, H. (2023). Penerapan P5 Pada Kurikulum Merdeka Pada Jenjang SD. *Taroa: Jurnal Pengabdian Masyarakat*, *2*(2). https://doi.org/10.52266/taroa.v2i2.1069

Zubaidah, S. (2016). Keterampilan Abad Ke-21 : Keterampilan Yang Diajarkan. *Seminar Nasional Pendidikan*, *2*(2).