



The effect of using greenhouses as a learning medium in horticulture subjects on the skills of grade X agribusiness crops students at SMKN 3 Sidenreng Rappang

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Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan greenhouse sebagai media pembelajaran terhadap keterampilan siswa pada mata pelajaran hortikultura. Jenis penelitian yang digunakan adalah pre-eksperimental dengan desain one group pretest-posttest. Subjek penelitian adalah seluruh siswa kelas X Agribisnis Tanaman SMKN 3 Sidenreng Rappang yang berjumlah 11 orang. Data diperoleh melalui lembar observasi (checklist) yang digunakan sebelum dan sesudah perlakuan. Hasil penelitian menunjukkan bahwa terdapat peningkatan yang signifikan dalam keterampilan siswa setelah pembelajaran menggunakan greenhouse. Rata-rata skor sebelum pembelajaran sebesar 3,11 meningkat menjadi 4,81 setelah pembelajaran, dengan selisih rata-rata sebesar 1,70 poin. Hasil ini menunjukkan bahwa penggunaan greenhouse sebagai media pembelajaran efektif dalam meningkatkan keterampilan siswa dalam budidaya hortikultura.

kata kunci: greenhouse, media pembelajaran, hortikultura, keterampilan siswa, pembelajaran praktik.

Abstract

This study aims to determine the effect of using greenhouses as a learning medium on students' skills in the horticulture subject. The type of research used is pre-experimental with a one-group pretest-posttest design. The subjects of this study were all Grade X Agribusiness Crops students at SMKN 3 Sidenreng Rappang, totaling 11 students. Data were obtained through an observation checklist used before and after the treatment. The results showed a significant improvement in students' skills after learning using the greenhouse. The average score before the learning activity was 3.11, which increased to 4.81 after the learning, with a mean difference of 1.70 points. These results indicate that the use of greenhouses as a learning medium is effective in improving students' skills in horticultural cultivation.

Keywords: Greenhouse, Learning Media, Horticulture, Student Skills, Practical Learning.

Introduction

Education plays a pivotal role in the holistic development of individuals, encompassing spiritual, emotional, intellectual, and practical aspects. According to Law No. 20 of 2003 on the National Education System in Indonesia, education is defined as a conscious and planned effort to create an effective learning environment and learning process, enabling learners to actively develop their potential. This includes not only theoretical knowledge but also essential skills that are relevant to personal growth and societal needs.

In vocational education, especially in agricultural and horticultural studies, the integration of practical learning is essential. One crucial component that supports effective learning is the use of learning media. Learning media serve as tools or methods to convey messages, knowledge, and skills in ways that enhance student engagement and comprehension. Effective media allow students to visualize concepts, participate actively, and gain hands-on experience, particularly in subjects requiring practice, such as horticulture.

Learning media can take various forms, including visual, audio, audiovisual, and interactive tools. The development of media in education has evolved with technological advances, allowing educators to adopt innovative methods to deliver complex materials. In the context of vocational horticultural education, using media such as greenhouses offers students the opportunity to learn through direct observation and practice, creating a more meaningful and applied learning experience.

A greenhouse is a structure designed to provide a controlled environment for plant cultivation. It allows for the regulation of temperature, humidity, and light intensity, supporting optimal plant growth regardless of external weather conditions. The implementation of greenhouses in educational settings provides students with real-world applications of theoretical concepts. It supports environmental control, experimentation, and cultivation practices that reflect actual agricultural conditions.

Utilizing greenhouses as learning media is particularly relevant in horticulture subjects, where students must acquire skills in planting, maintaining, and harvesting crops. Greenhouses support students in developing these competencies in a structured and safe

environment. This practical exposure is crucial for building students' confidence and competence in agricultural techniques, which are essential for future employment in the agribusiness sector.

Horticulture, as a branch of agriculture, deals with the cultivation of vegetables, fruits, medicinal plants, and ornamental crops. This field requires both theoretical knowledge and practical skills. With Indonesia's rich biodiversity and strong agricultural potential, developing students' abilities in horticulture is vital for national food security and sustainable development. Therefore, effective teaching strategies—including the use of greenhouses—are needed to prepare competent graduates in vocational schools.

Several previous studies have highlighted the benefits of using greenhouses in education. For instance, research shows that greenhouses encourage students to take responsibility, develop environmental awareness, and improve technical skills in plant cultivation. These studies suggest that incorporating greenhouses into the learning process can enhance the relevance, engagement, and effectiveness of agricultural education.

Based on the importance of integrating practical learning tools in vocational education, this study aims to examine the effect of using greenhouses as a learning medium on students' skills in horticulture subjects. Specifically, it investigates how greenhouse-based learning can improve the competencies of Grade X Agribusiness Crops students at SMKN 3 Sidenreng Rappang. The research focuses on evaluating students' skill development before and after the implementation of greenhouse learning, thereby assessing its effectiveness as an instructional strategy.

Method

This study employed a pre-experimental research design, specifically the one-group pretest-posttest design, to evaluate the effect of using a greenhouse as a learning medium on students' horticultural skills. In this design, the same group of students was tested before and after the treatment to observe any changes in their skill levels. No control group was involved, which means all participants received the same instructional intervention using the greenhouse.

The research was conducted at SMKN 3 Sidenreng Rappang, located in Ciro-Ciroe,

Watang Pulu District, Sidenreng Rappang Regency, South Sulawesi. The selection of this school was based on its specialization in agribusiness and agricultural technology, which aligns closely with the objectives of the study. The school environment, which supports practical agricultural learning, made it a suitable setting for this research.

The population of the study consisted of all students in Grade X Agribusiness Crops class, totaling 11 students. Since the number of students was relatively small and focused, the entire population was used as the research sample. This purposive sampling ensured that the research was focused on individuals directly involved in horticulture learning, increasing the relevance and validity of the results.

To collect data, three techniques were employed: observation, documentation, and checklist assessments. Observation allowed the researcher to monitor students' activities during the learning process using the greenhouse. Documentation was used to support the findings through photos, activity logs, and records of the greenhouse learning sessions. Meanwhile, the checklist was used to measure specific indicators of students' horticultural skills.

The checklist was designed to assess five main skill areas: (1) planning greenhouse activities, (2) practicing cultivation techniques, (3) using agricultural tools and technologies, (4) working collaboratively in teams, and (5) evaluating the results of cultivation. Each indicator was scored on a scale from 1 to 5, ranging from "Very Poor" to "Very Good". This instrument enabled the researcher to obtain quantitative data reflecting students' performance before and after the greenhouse-based learning.

The data analysis consisted of both descriptive and inferential statistics. Descriptive analysis was used to determine the mean, median, mode, standard deviation, and distribution range of students' scores. This analysis provided a clear picture of the students' skill levels before and after the intervention. Inferential statistics were applied using the paired samples t-test, to determine whether there was a statistically significant difference between pretest and posttest scores.

Before conducting the t-test, the researcher performed prerequisite tests, including normality and homogeneity tests. The Shapiro-Wilk and Kolmogorov-Smirnov tests showed that the data

were normally distributed, allowing the use of parametric statistical methods. However, the homogeneity test (Levene's Test) revealed unequal variances in the pretest data, prompting the researcher to interpret the results with caution and consider additional supporting evidence.

The results of the paired samples t-test indicated a significant increase in students' skill scores after the greenhouse intervention, with a significance value (p-value) of 0.000, well below the 0.05 threshold. This confirmed that the use of the greenhouse as a learning medium had a statistically significant positive impact on students' horticultural skills. The methodology thus successfully supported the research objective of evaluating the effectiveness of practical, greenhouse-based instruction in vocational agricultural education.

Result and Discussion

The results of this study describe the impact of using a greenhouse as a learning medium on the horticultural skills of Grade X Agribusiness Crops students at SMKN 3 Sidenreng Rappang. The data were collected using a checklist instrument to assess students' skills before and after the learning intervention in the greenhouse.

In the pretest, students were assessed before being exposed to greenhouse-based learning. The mean pretest score was 59.27, with a standard deviation of 7.94. Most students fell into the "Fair" and "Good" categories, indicating that their initial skills were moderate. None of the students scored in the "Very Good" or "Poor" categories.

After the learning intervention using the greenhouse, a posttest was conducted. The average posttest score rose significantly to 95.18, with a very small standard deviation of 0.98, showing that students' performance was more uniform and consistently high after the treatment. All students achieved scores within the "Very Good" category.

Table 1. Comparison of Pretest and Posttest Results

N o	Stude nt Initials	Prete st Score	Postte st Score
1	RD	61	97
2	WA	68	95
3	SK	69	95
4	JK	52	96

o	N	Stude	Prete	Postte
o	nt	nt Initials	st Score	st Score
5	NA		51	95
6	RA		70	96
7	MA		62	96
8	MR		46	94
9	A		56	94
1	IW		55	95
1	SN		62	94
ge	Avera	7	59.2	95.18

The difference between the pretest and posttest means was 35.91 points, indicating a substantial improvement in students' skills after learning with the greenhouse. This shows that the intervention was effective in developing their practical competencies.

A paired samples t-test was conducted to examine the statistical significance of the difference. The results showed a t-value of -15.467 and a p-value of 0.000, which is lower than the significance level of 0.05. This confirmed that the improvement in scores was statistically significant.

The distribution of student performance before the intervention was varied, with some students struggling in key areas such as cultivation planning and tool usage. After the intervention, however, students demonstrated increased proficiency in planning greenhouse activities, using tools appropriately, and collaborating with peers.

The standard deviation dropped significantly from pretest to posttest, reflecting greater consistency in student achievement. This indicates that greenhouse learning not only improved overall skills but also reduced performance gaps among students.

The results support the hypothesis that using a greenhouse as a learning medium has a positive effect on students' horticultural skills. All aspects of the skills assessed—technical, procedural, collaborative, and evaluative—showed marked improvement.

DISCUSSION

The findings of this study confirm that the use of a greenhouse as a learning medium significantly enhances students' horticultural skills. This supports previous research indicating that learning environments offering direct

experience result in better knowledge retention and skill acquisition.

The use of greenhouses allows students to engage directly with the learning material through hands-on practice, which bridges the gap between theory and real-world application. This is particularly important in vocational education, where skill-based learning is critical to student success.

The structured environment provided by the greenhouse allowed students to experience controlled conditions that are ideal for practicing plant cultivation. Students learned about temperature regulation, humidity control, watering techniques, and plant care, all of which contributed to their skill development.

Additionally, students practiced using agricultural tools and technology, which helped improve their confidence and familiarity with real-world equipment. This practical exposure is invaluable in preparing them for work in the agricultural sector.

Team collaboration also improved. Working in the greenhouse environment required students to divide tasks, support each other, and communicate effectively—skills that are essential in any professional field. This suggests that greenhouse-based learning also fosters soft skills in addition to technical skills.

The results showed that students who initially had lower scores in the pretest were able to catch up with their peers after the intervention. This indicates that the greenhouse method not only benefits high achievers but is also inclusive and effective for all learning levels.

From an instructional standpoint, the use of greenhouse media allowed teachers to observe and assess students' progress more objectively. The use of checklists and structured tasks helped ensure consistent evaluation and provided clear benchmarks for improvement.

In conclusion, the greenhouse served not just as a facility but as a transformative learning environment. It supported active learning, fostered independence, encouraged collaboration, and enhanced students' mastery of horticultural practices. These outcomes validate the integration of practical learning tools in vocational education and suggest that similar methods could be adopted in other skill-based subjects.

Conclusion

Based on the results of this study, it can be concluded that the use of a greenhouse as a learning medium has a significant positive effect on improving the horticultural skills of Grade X Agribusiness Crops students at SMKN 3 Sidenreng Rappang. The results showed a substantial increase in students' average scores from 59.27 in the pretest to 95.18 in the posttest after learning through practical greenhouse-based activities. This confirms the effectiveness of greenhouse-based learning in bridging theoretical knowledge with hands-on application.

The statistical analysis, specifically the paired samples t-test, further validated the significance of the improvement, with a p-value of 0.000 indicating a highly significant difference. All students demonstrated better mastery in planning cultivation, using tools and technology, working in teams, and evaluating results. Moreover, the greenhouse environment supported experiential learning, improved collaboration, and boosted student confidence in performing horticultural tasks.

In summary, the integration of greenhouses in vocational education not only enhances students' technical skills but also fosters critical thinking, problem-solving, and teamwork. These findings highlight the importance of practical-based learning in agricultural education and suggest that the implementation of greenhouses or similar facilities should be encouraged more widely in vocational schools to support student competency and readiness for the workforce.

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