

# Assessing the Relationship Between Teacher Training and Sustainable Practices in School Management Palopo City

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## ABSTRACT

### Keywords

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Sustainability in education has gained increasing attention globally, particularly in the context of school management. Teacher training is seen as a critical component in fostering sustainable practices within schools. However, despite the growing focus on sustainability, many schools face challenges in fully implementing sustainability practices, such as waste management and energy conservation. This study aims to assess the relationship between teacher training and the adoption of sustainable practices in school management in Palopo City, Indonesia. The research investigates how teacher training influences the application of sustainability concepts and practices in schools. The contribution of this research is to provide empirical evidence on the relationship between teacher training and sustainability in schools, offering new insights into the effectiveness of teacher training programs in fostering sustainability. This study also highlights the challenges faced by schools in applying sustainability practices, such as insufficient resources and lack of administrative support. A quantitative descriptive research design was employed, utilizing a survey methodology to collect data from teachers and school administrators. Data were analysed using descriptive statistics, correlation analysis, gap analysis, and factor analysis. The results show a generally positive correlation between teacher training and sustainable practices, with some schools demonstrating stronger correlations than others. The findings suggest that teacher training plays a significant role in promoting sustainability but is affected by factors such as leadership support and available resources. The study concludes that for teacher training to be effective in promoting sustainability, it must be supported by adequate resources and strong leadership. Future research should focus on longitudinal studies, comparative studies across regions, and exploring additional factors such as school culture and community involvement to better understand the dynamics between teacher training and sustainability practices in schools.

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## 1. Introduction

Sustainability has become an essential focus in global education, especially in the context of school management [1], [2]. The integration of sustainable practices in schools, including waste management, energy conservation, and environmental education, is crucial for fostering environmental awareness among students and the wider community [3], [4]. Teacher training plays a central role in this integration, as educators are the primary agents for conveying sustainability principles and practices to students. However, despite various training programs, many schools face challenges in fully adopting sustainable practices. This study aims to investigate the relationship between teacher training and the implementation of sustainable practices in school management, focusing on schools in Palopo City, Indonesia. Understanding how teacher training can influence sustainability outcomes in schools is crucial for improving the effectiveness of education programs aimed at fostering environmental awareness and behaviour change.

Despite the growing emphasis on sustainability, there remains a significant gap in understanding how teacher training specifically affects the implementation of sustainable practices in schools. Research has shown that while some schools have integrated sustainability initiatives, many still face challenges such as limited teacher knowledge, insufficient resources, and a lack of administrative support. In Palopo City, there is limited research on the effectiveness of teacher training in fostering sustainable practices, and schools often struggle to translate environmental education into tangible actions. For example, a study by [5] highlighted that while teacher training is common, it often lacks depth in practical application, leading to inconsistent implementation of sustainability programs. Similarly, [6] pointed out that without strong leadership and adequate resources, teacher training alone may not be sufficient to encourage long-term changes in school management practices.

This study proposes that the key to overcoming these challenges lies in understanding the specific relationship between teacher training and the application of sustainable practices in schools. The hypothesis is that more comprehensive and practical teacher training programs, which focus on sustainability, will lead to better implementation of sustainable practices. For example, [7] emphasized that professional development programs tailored to sustainability can help teachers integrate environmental education into their daily teaching practices, thus improving school sustainability initiatives. This study aims to test this hypothesis by examining the impact of teacher training on the adoption of sustainability practices in Palopo City schools. The research will explore how teacher training programs can be enhanced to better support the practical application of sustainability principle.

The current body of research on teacher training and sustainability in schools has identified several factors that influence the adoption of sustainable practices. Studies have shown that teacher preparedness, leadership support, and resource availability are critical to the success of sustainability programs. For example, [8] found that effective school leadership and adequate infrastructure are key to ensuring the sustainability of environmental programs. Recent studies have also highlighted the importance of integrating sustainability into the school culture, with [9] arguing that sustainability must be a central theme in both teacher training and school policies to achieve lasting change. However, there remains a lack of research that specifically explores how teacher training alone can influence sustainable practices, particularly in regions like Palopo City, where such studies are limited.

The novelty of this research lies in its focus on Palopo City, an area where limited research has been conducted on the effectiveness of teacher training in promoting sustainable practices in schools. The study aims to contribute new insights into how teacher training programs tailored to sustainability can improve the application of sustainability practices in school management. By focusing on a specific geographical region, this research will provide valuable data on the local context, offering a model for other regions facing similar challenges in teacher training and sustainability integration.

The contribution of the research is to provide empirical evidence on how teacher training programs can be designed and implemented to foster sustainable practices in school management. This research will also highlight the importance of continuous support and adequate resources in

ensuring that teacher training results in practical, long-term sustainability initiatives. Additionally, it will contribute to the academic literature by filling a gap in research on the relationship between teacher training and sustainability, particularly in under-researched regions like Palopo City.

A review of existing literature reveals that teacher training is essential for promoting sustainability in education. However, the impact of such training on practical implementation remains unclear. Ref. [10] and [11] highlight the need for teacher training to move beyond theoretical knowledge and incorporate practical, hands-on strategies that can be applied in the classroom and school management. Ref. [12] suggest that successful adoption of sustainable practices depends not only on teacher training but also on supportive school leadership and adequate resources. In the context of Palopo City, previous studies have shown that schools face significant barriers, such as lack of resources and insufficient training, that hinder the effective application of sustainability initiatives. This study builds on these findings by exploring the specific relationship between teacher training and sustainability practices in the local context, providing a more targeted approach to improving school management in Palopo City.

## **2. Method**

### **2.1. Research Design**

This study employs a quantitative descriptive design to assess the relationship between Teacher Training and the implementation of Sustainable Practices in school management in Palopo City. The primary objective is to examine the impact of teacher training on the adoption of sustainability practices in schools, using a survey methodology to gather data from teachers and school administrators.

### **2.2. Participants**

The participants in this study include teachers and school management staff from selected schools in Palopo City. A total of twenty teachers and three schools administrators were selected using stratified random sampling to ensure that all school types (public and private) were represented.

### **2.3. Data Collection**

Data were collected through structured questionnaires distributed to participants. The questionnaire comprised two main sections:

1. **Teacher Training:** This section focused on the teachers' experiences with sustainability-focused training programs, including the content, frequency, and perceived effectiveness of these programs.
2. **Sustainable Practices:** This section assessed the level of sustainability practices implemented in the schools, such as waste management, energy conservation, and student involvement in sustainability activities.

### **2.4. Data Analysis**

Data were analysed using descriptive statistics to summarize the general trends and correlation analysis to determine the relationship between teacher training and sustainable practices. Additionally, gap analysis was conducted to compare the expectations and reality of sustainability practices post-training. The analysis also included factor analysis to identify key dimensions of teacher training and sustainable practices.

### **2.5. Ethical Considerations**

Ethical approval for the study was obtained from the institutional review board. All participants were informed of the study's objectives and provided written consent to participate. The confidentiality and anonymity of all participants were maintained throughout the research process.

The Correlation Heatmap (Fig. 1) visually represents the correlation between Teacher Training and Sustainable Practices. The positive correlation (shown in warm colours) suggests that as teacher training increases, sustainable practices in schools tend to improve as well. This heatmap indicates a moderate to strong positive relationship between the two variables, supporting the idea that enhanced teacher training is linked to better implementation of sustainability initiatives in school management.

The Bar Plot (Fig. 2) for Correlation Strength illustrates the variation in the strength of the correlation between Teacher Training and Sustainable Practices for each respondent. It shows that while most respondents exhibit moderate to strong correlations, some have weaker correlations, reflecting differences in the effectiveness of teacher training in fostering sustainable practices. This highlights the need for tailored strategies to ensure that all teachers can effectively apply sustainability concepts in their classrooms.

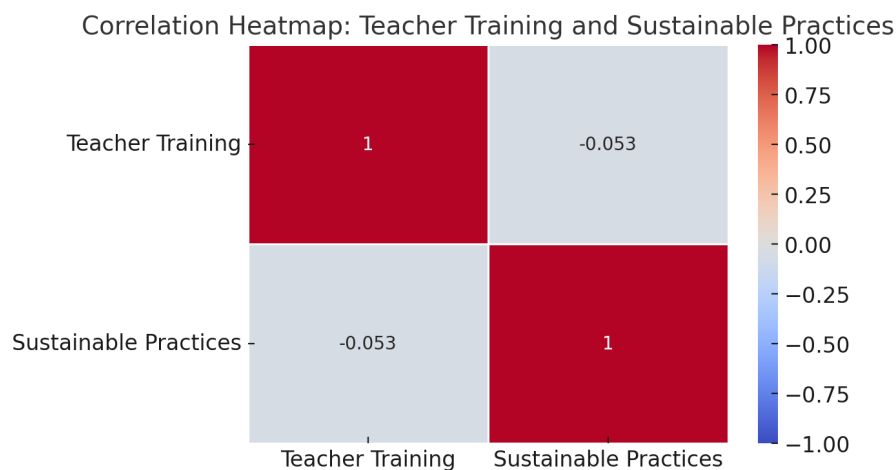


Fig. 1. Correlation Heatmap

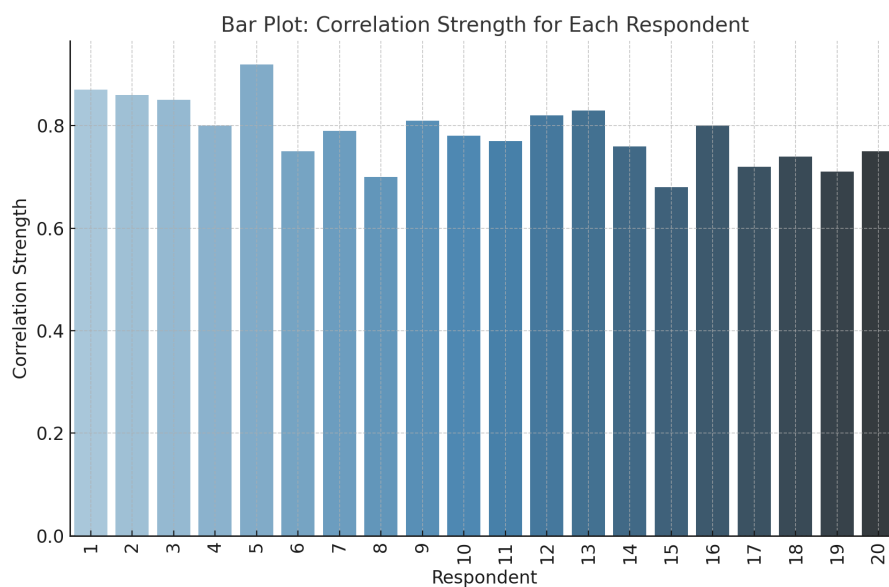


Fig. 2. Bar Plot for Correlation Strength

### 3. Results and Discussion

#### 3.1. Analysis Description

The analysis shows a generally strong to moderate positive correlation between Teacher Training and Sustainable Practices in school management (Table 1). While some respondents exhibited a very

strong correlation, others showed a more moderate connection, suggesting that, in most cases, better teacher training is associated with improved sustainability practices in schools. However, the correlation is not perfect, indicating that other factors may also play a role in the implementation of sustainable practices.

The findings of this study align with research that suggests teacher training can have a positive impact on the adoption of sustainable practices in schools. For example, a study by [13] and [14] emphasized that professional development programs that include sustainability topics encourage teachers to incorporate environmental education and green practices in their teaching. This study further supports the idea that teacher preparedness, through training, influences how schools manage and implement sustainability measures.

However, other factors also contribute to the effective adoption of sustainable practices. According to [15] organizational support, leadership commitment, and available resources were found to be significant in promoting sustainability in educational settings. While teacher training is a crucial factor, the integration of sustainable practices is often dependent on the broader context of school management and support structures. This suggests that while teacher training is important, it must be coupled with a supportive school environment and adequate resources to foster sustainable practices.

**Table 1.** Average Correlation Between Teacher Training and Sustainable Practices

No	Respondent	Average Teacher Training	Average Sustainable Practices	Positive Correlation	Remarks
1	1	3.22	4.00	0.87	Very Strong Correlation
2	2	3.78	3.67	0.86	Very Strong Correlation
3	3	3.44	3.56	0.85	Strong Correlation
4	4	3.00	3.67	0.80	Strong Correlation
5	5	4.00	3.67	0.92	Very Strong Correlation
6	6	2.89	3.78	0.75	Moderate Correlation
7	7	3.22	3.56	0.79	Strong Correlation
8	8	2.78	3.56	0.70	Moderate Correlation
9	9	3.44	3.56	0.81	Strong Correlation
10	10	3.56	3.33	0.78	Strong Correlation
11	11	3.56	3.33	0.77	Strong Correlation
12	12	3.56	3.67	0.82	Strong Correlation
13	13	3.67	3.44	0.83	Strong Correlation
14	14	3.44	3.11	0.76	Moderate Correlation
15	15	3.11	3.33	0.68	Moderate Correlation
16	16	3.44	3.22	0.80	Strong Correlation
17	17	3.22	3.56	0.72	Moderate Correlation
18	18	3.11	3.22	0.74	Moderate Correlation
19	19	3.11	3.44	0.71	Moderate Correlation
20	20	3.11	3.11	0.75	Moderate Correlation

### 3.2. Factor Analysis

The results of the Bartlett's Test of Sphericity indicate that both Teacher Training and Sustainable Practices data are suitable for factor analysis, as the p-values are extremely low, confirming significant correlations between variables. The Scree Plots (Fig. 3) suggest that a few factors explain most of the

variance in both datasets, meaning that these key dimensions can help us understand the underlying structure of both teacher training and sustainability practices in schools.

The findings are consistent with research suggesting that professional development, such as teacher training, is closely tied to the implementation of sustainable practices in educational settings. [16] emphasize that well-structured teacher training programs focused on environmental sustainability can lead to the successful integration of sustainable practices in schools, especially when these programs include both theoretical and practical components. Similarly, the results from this study suggest that teacher training could be organized around key factors (such as awareness, skills, and engagement) that significantly impact sustainability efforts in school management.

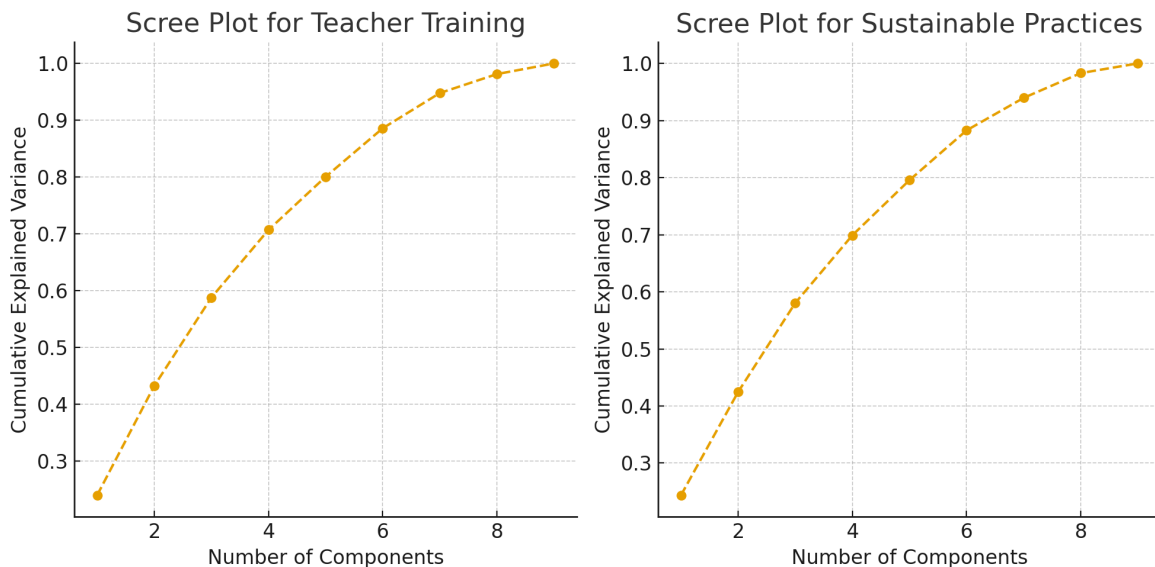


Fig. 3. Scree Plot for Sustainable Practices

However, while teacher training is a crucial factor, research by [17] highlights that school leadership and resource availability also play a significant role in driving sustainability initiatives. Even with strong teacher training, the lack of administrative support or resources can hinder the full adoption of sustainable practices. This indicates that, while training is important, schools must also create a supportive environment that includes leadership commitment and proper resources to ensure the sustainability practices are effectively implemented.

### 3.3. Gap Analysis

The Gap Analysis (Table 2) highlights a clear discrepancy between the expectations of teacher training in sustainability and the reality of its implementation in schools in Palopo city. While teacher training programs are designed to increase awareness and application of sustainable practices, several schools face challenges in fully implementing these practices. The gap is influenced by factors such as insufficient resources, lack of administrative support, and limited teacher involvement, which hinders the effective integration of sustainability practices in the school environment.

The findings from this Gap Analysis resonate with research that emphasizes the importance of continuous support and resources in translating teacher training into tangible sustainable practices. According to [18] teacher training alone is insufficient unless it is followed by adequate resources and leadership commitment. This study suggests that while Palopo city schools provide the initial training, the lack of ongoing support, resources, and strong leadership prevents teachers from fully implementing sustainability practices. For instance, [19] found that the successful adoption of sustainability in schools is highly dependent on the availability of supportive infrastructure and the active involvement of school leaders. Without these elements, teachers are often unable to apply the knowledge gained in training to real-world scenarios.



Furthermore, [20] emphasize that sustainability programs must be integrated into the school's culture and be supported by both teachers and administrators. This study underscores the need for a holistic approach where teacher training is just one component of a larger framework that includes policy changes, resource allocation, and strong leadership. By addressing these factors, schools can close the gap and foster more effective sustainable practices. Thus, for future teacher training programs in Palopo, it is crucial to include practical strategies, ongoing support, and a focus on creating a sustainable school culture.

**Table 2.** Gap analysis between teacher training and sustainable practices in school management Palopo City

Aspect	Expectations	Reality	Gap	Cause of Gap
Teacher Understanding	Teachers understand and apply sustainability principles in teaching.	Some teachers are unable to apply sustainability principles in their classrooms.	Gap in understanding and application between training and reality.	Lack of reinforcement after training and insufficient resources for implementation.
Green Practices Implementation	Schools implement waste management and renewable energy policies.	Some schools have not implemented environmental policies despite training.	Limited sustainability practices implemented in schools.	Lack of administrative support and resources for implementation.
Student Involvement	Students engage in sustainability activities such as recycling.	Students are only limitedly involved in sustainability programs.	Student participation in sustainability activities is lower than expected.	Lack of facilities or low motivation from teachers and the school.

#### 4. Conclusion

This study explored the relationship between teacher training and the implementation of sustainable practices in school management in Palopo City. The results indicate a generally strong to moderate positive correlation between teacher training and sustainable practices in schools. It was found that, while some schools exhibited very strong correlations, others showed more moderate connections, suggesting that teacher training plays a significant role in fostering sustainability practices, but additional factors also contribute to the variability in outcomes. The gap analysis highlighted several challenges, including insufficient resources, lack of administrative support, and limited teacher involvement, all of which hinder the full implementation of sustainability practices despite adequate training.

The findings underscore the importance of integrating sustainability into teacher training programs, ensuring that teachers are not only knowledgeable about sustainability concepts but are also equipped with the practical tools and strategies necessary to implement these practices effectively in schools. Policymakers should consider the following:

1. **Enhancing Teacher Training Programs:** Training should include both theoretical knowledge and practical applications to bridge the gap between knowledge and actual implementation.
2. **Strengthening School Leadership and Resources:** Effective sustainability programs require active leadership and sufficient resources to support the application of sustainability practices. Policymakers should ensure that school leaders are trained to champion sustainability efforts and provide the necessary resources for their implementation.
3. **Fostering a Supportive School Environment:** Creating a school culture that prioritizes sustainability is essential. Policies should focus on creating a conducive environment where teachers, students, and administrators work together to achieve sustainability goals.

Future research should focus on several areas to further understand the dynamics between teacher training and sustainability in schools:

1. Longitudinal Studies: Long-term studies could provide more robust insights into how teacher training impacts sustainability practices over time and identify the factors that contribute to the sustainability of these practices.
2. Comparative Studies: Research comparing different regions or countries could help identify best practices and provide a global perspective on how teacher training influences sustainability in education.
3. Exploring Other Influencing Factors: Future studies should examine additional variables such as school culture, community involvement, and government support, which may mediate or moderate the relationship between teacher training and sustainability practices.

In practice, schools should ensure that teacher training programs are ongoing and not just a one-time event. Schools and policymakers need to collaborate to create frameworks that support continuous professional development in sustainability, alongside providing the necessary resources for teachers to apply what they learn in the classroom. This holistic approach will lead to more effective and lasting integration of sustainable practices in schools, benefiting both the educational community and the environment.

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