Journal of Educational Sciences
Journal homepage: https://jes.ejournal.unri.ac.id/index.php/JES
P-ISSN 2581-1657
E-ISSN 2581-2203

Implementation of Android-Based E-Raso Media to Enhance Students' Environmental Care Character in Bima

Didit Haryadi*, Zulkifli, Sumardin, Ahmadin, Desy Ningsih Komalasari
STKIP Taman Siswa Bima, Indonesia, Bima, 84171, Indonesia

ARTICLE INFO

Article history:

Received: 22 Sept 2025
Revised: 13 Oct 2025
Accepted: 25 Oct 2025
Published online: 05 Nov 2025

Keywords:

Implementation;
E-Raso Media;
Android;,
Adiwiyata ;
Environmental Character

* *Corresponding author:*

E-mail: ditidharyadi18@gmail.com

Article Doi:

https://doi.org/10.31258/jes.9.6.p.5443-5451

A B S T R A C T

Ideally junior high school students should demonstrate awareness and concrete practices such as reducing plastic waste, maintaining cleanliness, reusing waste materials, and actively participating in greening activitiesThe objectives of this study are: (1) to determine the effect of using the Android-based E-Raso media to enhance students' environmental care character, and (2) to identify the factors that influence students' environmental care character. This research employs a quantitative approach with a pre-experimental method and a One-Group Pretest-Posttest design. The study was conducted at SMPN 1 Kota Bima with a sample of 33 students. Data collection techniques included both test and non-test methods. The test instrument consisted of pretest and posttest questions, while the non-test instrument consisted of documentation. The results showed a significant increase in the average score, rising from 59.50% on the pretest to 86.83% on the posttest. The paired-sample t-test yielded a significance value of 0.000 ($p < 0.05$), confirming a significant effect of using the Android-based E-Raso media in improving students' environmental care character. Therefore, the Android-based E-Raso media proved to be influential and effective, serving as one of the supporting factors for enhancing this ability.

1. Introduction

Twenty-first century education requires students not only to excel cognitively but also to develop strong character, including a sense of environmental care (Banarsari et al., 2023). Schools are expected to serve as centers for fostering environmentally friendly behavior through learning processes, teacher role modeling, and a supportive school culture (Nursya, 2023). Ideally, junior high school students should demonstrate awareness and concrete practices such as reducing plastic waste, maintaining cleanliness, reusing waste materials, and actively participating in greening activities. With the continuous advancement of digital technology, application-based learning media can become an effective means of instilling these values in an engaging and interactive way (Hermawan & Mahmudah, 2023). The actual conditions in the field, particularly at SMPN 1 Kota Bima, present significant

challenges. Initial observations and interviews with science teachers revealed that many students are still inconsistent in applying environmentally friendly behaviors. Habits such as littering, lack of awareness about conserving energy, and minimal participation in the Adiwiyata (eco-school) program remain prominent issues (Niswah et al., 2024). Learning processes that are still dominated by lectures and conventional media make students quickly lose interest, causing environmental education messages to be absorbed less effectively (Hermawan & Mahmudah, 2023). In today's digital era, students are more familiar with gadgets and Android applications, yet this potential has not been maximized as a medium for instilling environmental awareness (Nurwidodo et al., 2020).

If this situation is left unaddressed, it may lead to various negative impacts in both the short and long term. Within the school environment, a low level of environmental care character will reduce cleanliness and aesthetics, create health problems, and damage the micro-ecosystem around the school, undermining the Pancasila Student Profile—especially the dimensions of noble character and mutual cooperation (Utomo et al., 2023). In the long run, the lack of ecological awareness among the younger generation will contribute to global environmental crises such as increasing plastic waste, water pollution, and declining ecological carrying capacity. From an educational perspective, the school's inability to cultivate environmental care character will hinder the achievement of national curriculum goals that emphasize character education (Sujarwo et al., 2022).

To respond to the gap between ideal conditions and reality, innovation in learning media is urgently needed (Siahaan et al., 2021). The implementation of Android-based E-Raso media emerges as a practical solution. This application enables teachers to monitor students' activities, provide real-time feedback, and foster intrinsic motivation through a points or digital rewards system. Integrating E-Raso with the school curriculum can support Project-Based Learning and strengthen the Adiwiyata program (Hermawan & Mahmudah, 2023). Students are not only recipients of material but are also encouraged to take concrete actions such as documenting clean-up activities, composting, or conducting energy-saving campaigns, which can then be uploaded to the application (Abhari, 2022).

Through this approach, digital technology-often used merely for entertainment-can be transformed into a medium for building positive character (Yani et al., 2022). Furthermore, the application of Android-based E-Raso media aligns with the government's vision of promoting digital transformation in education and sustainable development, particularly Sustainable Development Goal 4 (quality education) and Goal 13 (climate action). It is expected that research on the implementation of E-Raso media at SMPN 1 Kota Bima will identify its effectiveness, challenges, and developmental steps, which can then be replicated in other schools as a model for environmental education innovation (Pahru et al., 2021).

2. Methodology

This study was conducted at SMPN 1 Kota Bima. A quantitative approach was employed using a pre-experimental method as the research design. The pre-experimental method was chosen because it allows the researcher to compare results before and after the use of Android-based E-Raso media in improving students' environmental care character. In addition, this method is more efficient and suitable for the resource limitations at SMPN 1 Kota Bima, as it is easier to implement. The research design applied was a One-Group Pretest–Posttest Design. The study involved the eighth-grade students of SMPN 1 Kota Bima as the population, meaning that all students in this class were used as research subjects to examine the impact of using Android-based E-Raso media on enhancing environmental care character.

The sampling technique used was saturated sampling (total sampling), in which all members of the population 33 students at SMPN 1 Kota Bimawere included as the sample. Data collection techniques consisted of both test and non-test methods. The test method was used to measure students' environmental care character before and after using the E-Raso media, while the non-test method complemented the test results with information that could not be directly measured through testing. The test instruments consisted of pretest and posttest questions to assess students' environmental care character before and after treatment. The non-test instrument was in the form of documentation. The data obtained were analyzed using descriptive statistical analysis to summarize and describe the data for easier interpretation. This analysis helped identify data patterns or trends before conducting hypothesis testing. Hypothesis testing was performed using SPSS 25 for Windows. The study's conclusions were drawn based on the results obtained, taking into account the normality of score distribution at a significance level of $p = 0.05$.

3. Results and Discussion

The results and discussion in this study are based on data obtained from research activities aimed at examining the implementation of Android-Based E-Raso Media to enhance students' environmental care character. The study was carried out in five systematically organized sessions. In the initial stage, the researcher conducted introductions and coordination with the school, explained the objectives of the study, and approached the students selected as the sample. The students were given an understanding of the learning process that integrates technology through the Android-Based E-Raso media. Afterward, a pretest was administered to measure their environmental care character. The pretest results served as a baseline for evaluating the development of environmental care character in the following sessions.

The treatment phase began in the third session, during which the researcher delivered material about the Android-Based E-Raso media focusing on environmental topics. The delivery of the material was systematically designed to

actively engage students in the learning process. In the next session, additional material was presented using the same approach but concluded with an interactive game as an evaluation tool available within the Android-Based E-Raso media. In the final session, a posttest was conducted to measure the improvement in students' environmental care character at SMPN 1 Kota Bima. Here is the image showing the results of the pretest and the implementation of the E-Raso media (Figure 1 and Figure 2).

Figure 1. Pretest of Android-Based E-Raso Media

Figure 2. Implementation of Android-Based E-Raso Media Usage

Descriptive Analysis Test

Based on the descriptive statistical results, the average pretest score was 57.50%, while the average posttest score increased significantly to 85.83%. This shows a substantial improvement in the posttest results compared to the pretest. These findings indicate that the E-Raso Media produced positive outcomes in enhancing students' environmental care character. The pretest score distribution tended to be left-skewed (negative skewness) and more dispersed, with a variance of 61.364. In contrast, the posttest score distribution was more concentrated, slightly right-skewed (positive skewness), and had a smaller variance of 53.788. Data consistency was also reflected in the narrower interquartile range (IQR) of the posttest,

indicating that most students experienced an improvement in environmental care character compared to the pretest. The descriptive results are presented in Table 1 below.

Table 1. Deskriptif Test

Pre Test	Mean		59.50	2.261
	95% Confidence Interval for Mean	Lower Bound	52.52	
		Upper Bound	62.48	
	5% Trimmed Mean		58.06	
	Median		60.00	
	Variance		61.364	
	Std. Deviation		7.833	
	Minimum		40	
	Maximum		65	
	Range		25	
	Interquartile Range		14	
	Skewness		-1.021	.637
	Kurtosis		.694	1.232
Post Test	Mean		86.83	2.117
	95% Confidence Interval for Mean	Lower Bound	81.17	
		Upper Bound	90.49	
	5% Trimmed Mean		85.65	
	Median		85.00	
	Variance		53.788	
	Std. Deviation		7.334	
	Minimum		75	
	Maximum		100	
	Range		25	
	Interquartile Range		10	
	Skewness		.488	.637
	Kurtosis		-.403	1.232

Normality Test Data

Based on the research findings, the p-values from both normality tests (Kolmogorov–Smirnov and Shapiro–Wilk) for the pretest and posttest data were greater than 0.05. Specifically, the Kolmogorov–Smirnov significance value for the pretest was 0.157, while the posttest significance value was 0.183. Meanwhile, the Shapiro–Wilk test produced significance values of 0.067 for the pretest and 0.448

for the posttest. Therefore, it can be concluded that both the pretest and posttest data are normally distributed, as presented in Table 2 below

Table 2. Normalitas Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pre Test	.209	12	.157	.871	12	.067
Post Test	.203	12	.183	.936	12	.448

Hypothesis Test: Paired Sample T-Test

Based on the research results, the p-value (Sig. (2-tailed)) was 0.000. Because this value is smaller than 0.05, it indicates a significant difference between the pretest and posttest scores. Thus, the use of E-Raso media was proven to improve students' environmental care character. This can be seen in Table 3 below.

Table 3. Paired Samples Test

Paired Differences									
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	df	Sig. (2-tailed)
Pair 1	Pre Test - Post Test	-28.333	11.348	3.276	-35.544	-21.123	-8.649	11	.000

This research was conducted based on real conditions observed during the initial observation at SMPN 1 Kota Bima, where it was found that students' environmental care character was still very low. To address this issue, the researcher carried out an experiment by implementing the Android-based E-Raso Media. Before applying the Android-based E-Raso Media, an initial measurement was taken through a pretest to assess the students' baseline environmental care character. The pretest results showed that students' environmental care character was still lacking. Based on descriptive statistical analysis, the students' average score before the implementation of the E-Raso media was 59.50%, indicating a very low level of environmental care character. After implementing the Android-based E-Raso Media, an evaluation was conducted through a posttest to measure the improvement in students' environmental care character at the school. The posttest results from the descriptive analysis showed that the average score increased significantly to 86.83%, demonstrating an improvement compared to the pretest scores prior to treatment. Therefore, the use of Android-based E-Raso Media successfully enhanced students' environmental care character. The increase in posttest scores, along with observational findings, indicates that students' environmental care character improved. The Android-based E-Raso Media proved effective in creating positive changes within the school environment and became one of the contributing

factors in strengthening students' environmental care character in Bima. Based on the descriptive statistical analysis in Table 2, the students' average score after treatment rose significantly to 86.83%, compared to the pretest average of 59.50% before treatment. Meanwhile, the t-test results showed a significance value of 0.000, which is smaller than the probability level of 0.05. This means the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted. Thus, the use of Android-based E-Raso Media has a significant positive effect on improving students' environmental care character at the school.

The factors influencing environmental care character include:

Family

The family is the first place where a child learns values and behaviors. Parenting patterns that emphasize habits such as maintaining cleanliness, conserving water, and sorting waste will instill good practices from an early age (Lubis et al., 2023). Parental role modeling such as regularly planting trees, using eco-friendly products, or turning off lights when not in use provides concrete examples that children can easily imitate (Saputra, 2021).

School

Schools play an important role in fostering environmental awareness. A curriculum that incorporates sustainability themes, the Adiwiyata (eco-school) program, and extracurricular activities such as environmental clubs provide both conceptual understanding and practical experience (Utomo et al., 2023). A school culture that emphasizes cleanliness, imposes sanctions for violations, and rewards environmentally friendly behavior helps shape consistent character (Haryadi, 2021).

Social and Cultural Community Environment

The values present within a community strongly influence how individuals view nature. Local wisdom that protects forests, traditions of collective clean-up (gotong royong), and customary norms that honor nature foster a sense of collective responsibility (Haryadi & Widodo, 2020). Interaction with peers who actively participate in green movements can also motivate individuals to get involved (Sumarjo et al., 2023).

Media and Technology

Media exposure has two sides. On one hand, documentaries, digital campaigns, and educational content on social media can inspire environmentally friendly behavior (Utomo et al., 2023). On the other hand, consumerist advertising and an instant-lifestyle culture can reduce ecological awareness if not balanced with media literacy and a critical mindset (Haryadi, 2022)

4. Conclusion

This study demonstrates that the use of Android-based E-Raso media can enhance students' environmental care character. In addition, the research identifies several factors that contribute to the improvement of students' environmental care character. These key findings are supported by the results showing a clear increase in students' environmental care character. Further statistical analysis also confirms that the Android-based E-Raso media has a positive impact on strengthening students' environmental care, as reflected in their more active engagement when using the Android-based E-Raso media. This makes the Android-based E-Raso media an engaging, effective, and relevant alternative for evaluation because it accommodates student activities both inside and outside the classroom. Therefore, integrating Android-based E-Raso media provides a significant solution for improving students' environmental care character, particularly at the junior high school level.

Acknowledgement

Thank you to the Ministry of Education, Culture, Research, and Technology (Kemdiktisaintek) for the opportunity to be one of the recipients of the PDP Grant in 2025. Sincere appreciation also goes to STKIP Taman Siswa Bima for their guidance and to the team for their support in carrying out and completing this article.

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How to cite this article:

Haryadi, D., Zulkifli., Sumardin., Ahmadin., & Komalasari, D. N. (2025). Implementation of Android-Based E-Raso Media to Enhance Students' Environmental Care Character in Bima. *Journal of Educational Sciences*, *9(6)*, 5443-5451.