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Innovation of Acehnese hikayat video series in Merdeka Curriculum learning waste management material

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Abstract: This study aims to analyze the effectiveness of an Acehnese hikayat-integrated video series for teaching waste management within the Merdeka Curriculum to elementary school students. This study employed a quasi experimental method with a nonequivalent control group design. The population consisted of 154 fifth grade students at an elementary school in Langsa City, Indonesia, from which 47 students were selected using purposive sampling. The participants were divided into an experimental group (n = 25), which received instruction using a series of Acehnese hikayat-integrated videos, and a control group (n = 22), which received instruction using conventional educational videos. Data were collected using a multiple choice test measuring students' understanding of waste management, covering the concepts, classification, environmental impacts, 3R principles, and waste sorting. The instrument demonstrated excellent reliability (KR-20 = 0.90). Data were analyzed using descriptive statistics and analysis of covariance (ANCOVA), with posttest scores as the dependent variable and pretest scores as the covariate. The ANCOVA results showed a significant effect of instructional group on students' posttest scores after controlling for pretest scores, $F(1, 44) = 63.975$, $p < .001$, partial $\eta^2 = .592$. The pretest score was not a significant covariate, $F(1, 44) = 0.575$, $p = .452$. These findings indicate that the Acehnese hikayat-integrated video series was significantly more effective than conventional educational videos in improving students' understanding of waste management. The findings highlight the potential of integrating local cultural narratives into digital learning media within the Merdeka Curriculum.

Keywords: video series; Acehnese hikayat; Merdeka Curriculum; waste management

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INTRODUCTION

Waste management in Indonesia remains a significant challenge and has not yet been addressed optimally. On March 12, 2025, President of the Republic of Indonesia Prabowo Subianto held a limited cabinet meeting to discuss comprehensive solutions for national waste management and instructed the formation of a task force to accelerate waste management, particularly through infrastructure development, technological approaches, and increased public awareness (Ministry of State Secretariat of the Republic of Indonesia, 2025). According to data from the National Waste Management Information System (SIPSN), based on reports from 245 of 514 regencies/cities in Indonesia in 2024, approximately 21 million tons of waste were generated annually. Of this amount, only 12 million tons (57.9%) were managed, while approximately 9 million tons (42.1%) remained unmanaged (Kementerian Lingkungan Hidup, 2024). Waste management in Indonesia therefore continues to face substantial challenges, particularly in reducing waste at the community level, where the reduction rate remains relatively low at approximately 5% (Purwaningrum, 2016).

In 2024, Langsa City generated 35,538.23 tons of waste annually. Of this amount, 3,244.97 tons (9.13%) were reduced, while 25,452.55 tons (71.62%) were handled, resulting in a total of 28,697.51 tons (80.75%) of waste being managed (Kementerian Lingkungan Hidup, 2024). For comparison, in 2022, Langsa City generated 34,470.24 tons of waste annually, equivalent to an average of 94.44 tons per day (AJNN, 2023). Looking at these data, it can certainly be concluded that Indonesia and especially Langsa City are experiencing a waste emergency. The Langsa City Government has made efforts to overcome the waste problem, one of which is by integrating the education sector, this can be seen from the circular of the Mayor of Langsa number 660/323/2022, namely emphasizing the role of the Education Office in educating students about cleanliness and waste management, forming a clean culture, integrating waste management in the Merdeka Curriculum, and supporting government efforts to create a clean environment through the establishment of waste banks at every level of education.

The efforts of the Langsa City government in solving waste have been appropriate, because the integration of education in overcoming the waste problem really needs to be a priority with the aim of increasing students' knowledge about waste management (Manyullei et al., 2022). Environmentally friendly waste management programs should be introduced to change students' mindsets and behaviors, so that they can contribute to a healthier environment (Ngalu, 2019). Activities carried out by students in waste management certainly contribute to environmental sustainability and can increase students' awareness of the importance of waste management and its impact on the environment, as well as encourage students to be active in maintaining cleanliness (Wahyuni & Sabban, 2019). Active student involvement creates a sense of ownership and responsibility for the environment, so that a healthy and beautiful environment can be achieved (Apriansyah & Sushanty, 2022). Learning that involves students in waste management makes it easier for students to understand issues related to the environment and encourages students to be actively involved in reducing waste (Saputra et al., 2024).

Previous research conducted in an elementary school in Bengkulu reported a waste generation rate of 2.222 litres/person/day, equivalent to 0.226 kg/person/day, with food waste identified as the dominant component. These findings indicate that waste management in schools requires more systematic and planned approaches. The absence of appropriate waste-management practices and effective learning strategies remains a challenge that needs to be addressed (Sari et al., 2023). In the context of the present study, these findings provide a relevant background for examining students' understanding of waste management in elementary schools in Langsa City.

The problems that occur are caused by students who do not yet understand in depth the impact of waste on health so that they do not change their character to care more about the environment. Then the waste produced has not been managed with the right method so that it piles up in the school environment and some on the roads of Langsa City. Littering has an impact on health, aesthetics, and global warming (Sari, 2016).

Then, the low understanding of students in implementing waste management has a negative impact on daily behavior, such as littering, storing it in open holes, burning it, and throwing it into rivers or drainage channels. Students' understanding of waste management is still low because the learning process has not involved students directly. The lack of direct practical activities in recycling waste, separating or sorting waste, composting practices, final disposal and the formation of environmental awareness are rarely carried out. The limited use of learning media is an additional factor that makes it difficult for students to understand waste management material. One of the learning media that can be applied in learning is video learning media that is integrated with local wisdom. As expressed by Mahlianurrahman and Aprilia (2022), the application of local wisdom-based video learning media can improve the quality of the learning process in schools. Teachers who successfully implement integrated learning with local wisdom have an impact on the effectiveness of learning (Putranto et al., 2023) and can increase students' emotional intelligence (Kintoko et al., 2023).

Aceh has a lot of local wisdom that can be integrated into learning and can have an impact on improving environmental care characters. One form of local wisdom that can be integrated into video learning media is the Acehnese hikayat (Asnelida et al., 2017). The Acehnese people use the Acehnese hikayat as a foundation in living their lives. This is certainly very relevant to the purpose of education, namely to make students who are faithful, pious and have good morals. The integrated Acehnese hikayat video series contains an interactive concept, so that students get the opportunity to be involved in waste management practices. The use of interesting, varied, and communicative media in learning is very important in increasing students' understanding, interest and enthusiasm (Andriani et al., 2019; Stefani, 2021; Yuanta, 2020) and is effective and relevant to be applied in the digital era (Nurfadilah et al., 2022).

In addition, integrating Acehnese local wisdom into learning can provide students with culturally familiar contexts for understanding environmental issues in their everyday lives. From the perspective of culturally responsive pedagogy, students' cultural backgrounds and local knowledge can serve as meaningful resources for learning by connecting instructional content with their lived experiences. This approach is particularly relevant to environmental education because waste management involves not only conceptual knowledge but also practical behaviors and ethical responsibility toward the environment. Furthermore, Mayer's multimedia learning theory suggests that learning can be supported when verbal and visual information are presented in a coordinated manner, allowing students to construct meaningful connections between words and images. Thus, combining Acehnese hikayat narratives with visual explanations of waste management provides both cultural and multimedia contexts for learning.

Previous studies have demonstrated the potential of local-wisdom- and folklore-based learning media to support elementary school learning, including the use of videos and other digital media for literacy, cultural learning, and student engagement. However, these studies have generally focused on literacy, cultural knowledge, or other subject areas, while studies on waste management education have rarely incorporated Acehnese narrative traditions into video-based instruction. This indicates a gap in the integration of local cultural narratives and environmental education, particularly in the context of waste management learning for elementary school students.

To address this gap, the present study developed an Acehnese hikayat integrated instructional video series that combines audio visual technology with local cultural knowledge. The series consists of five approximately five minute episodes, each addressing a specific waste management concept: the concept of waste, waste classification,

environmental impacts of waste, the 3R principles, and waste sorting. Acehnese hikayat narratives are integrated into the instructional content rather than being presented merely as supplementary cultural material. Each narrative is connected to the corresponding waste management concept and is intended to provide a culturally meaningful context for understanding the environmental issue. The videos were also reviewed by media, language, and subject matter experts before implementation.

Accordingly, the novelty of this study does not simply lie in the use of video or local wisdom as learning media, since both approaches have been examined in previous studies. Rather, the innovation lies in the specific integration of Acehnese hikayat as a narrative component of a structured, five episode multimedia series for waste management education at the elementary school level. This integration connects local cultural knowledge with environmental learning and provides a culturally responsive multimedia approach to developing students' understanding of waste management. The effectiveness of this approach was subsequently examined by comparing students' posttest understanding between the hikayat integrated video group and the conventional educational video group while controlling for pretest scores.

Departing from these problems, it is important to conduct research on innovations in Acehnese hikayat video series in Merdeka Curriculum learning of waste management material.

METHODS

Research Design

This research was conducted at an elementary school in Langsa City using a quasi-experimental nonequivalent control group design.

Participants

The study population consisted of 154 fifth grade students; from this group, 47 students were selected as the research sample using purposive sampling. Participant selection took into account the students' shared characteristics, specifically their level of environmental awareness. The selected students were divided into two groups: an experimental group of 25 students and a control group of 22 students. The experimental group received the intervention, while the control group participated in standard classroom instruction. The study was conducted after obtaining permission from the school. Student identities and data were kept confidential throughout the study, and the data were used solely for research purposes.

Instrument

A multiple choice test served as the research instrument to measure students' understanding of waste management. Initially, the instrument was developed with 36 items based on indicators of waste management understanding, covering: (1) the concept of waste, (2) waste classification, (3) the environmental impact of waste, (4) the 3R principles (reduce, reuse, recycle), and (5) waste sorting. The instrument underwent validation through expert assessment involving three media experts, three language experts, and three subject matter experts. Instrument validity was also analyzed using the Content Validity Index (CVI). Based on the item validity test results, 21 of the 36 items were deemed valid and subsequently used as the research instrument. Each item was scored dichotomously (1 for a correct answer and 0 for an incorrect answer), allowing the total score to be converted to a 0–100 scale. Instrument reliability was tested using the KR-20 formula, yielding a coefficient of 0.90, which indicates excellent internal consistency. The same instrument was

used for both the pretest and posttest to measure changes in students' understanding following the intervention.

Students' understanding of waste management material was assessed using a multiple-choice test developed based on the learning objectives and content presented in a video series integrating Acehnese hikayat. The instrument covered five key indicators: (1) the concept of waste, (2) waste classification, (3) the environmental impact of waste, (4) the 3R principles (reduce, reuse, and recycle), and (5) waste sorting.

Procedure

Instruction was conducted over five face to face sessions, each lasting 70 minutes. In the experimental class, five instructional videos each approximately five minutes long were utilized. Each video addressed a key topic within the waste management curriculum: (1) the concept of waste, (2) waste classification, (3) the environmental impact of waste, (4) the principles of reduce, reuse, and recycle, and (5) waste sorting. The videos were designed by integrating relevant verses from the Hikayat Aceh into the presentation of the waste management material. Segments from the Hikayat Aceh were placed at the beginning and middle of the videos to serve as a contextual narrative explaining waste management concepts. The Hikayat Aceh was employed as local wisdom content integrated directly into the learning material. Each class was given a pretest before learning and a posttest after learning was carried out.

Both the control and experimental classes utilized the same materials, number of sessions, instructional duration, and teacher. The difference lay in the fact that the control group used conventional instructional videos that presented the waste management material without the integration of the Hikayat Aceh.

Data Analysis

The data were analyzed using descriptive and inferential statistical techniques. Descriptive statistics were used to describe the data characteristics of the experimental and control groups, including minimum and maximum values, means, and standard deviations for pretest and posttest scores. A normality test was conducted using the Shapiro Wilk test because the sample size was less than 50, while homogeneity of variance was assessed using Levene's test. Subsequently, the equivalence of initial ability was analyzed by comparing the pretest scores of the experimental and control groups. Finally, an ANCOVA was performed with the posttest score as the dependent variable, the learning group as the independent variable, and the pretest score as the covariate. The statistical significance level was set at $\alpha = 0.05$.

RESULTS

The learning process using the Acehnese hikayat integrated video series began with the teacher explaining the learning objectives, particularly students' understanding of waste management. The teacher then presented the Acehnese hikayat integrated video series, which consisted of structured content on waste management. After viewing the videos, students participated in classroom discussions related to the waste management concepts presented in the videos and their relevance to everyday situations. Students were also given opportunities to ask questions and share their understanding of the material. The learning activities were followed by practice based on the waste management procedures presented in the videos. Students' understanding of waste management was measured using pretest and posttest scores. The results of the student understanding test on the waste management material can be seen in Table 1.

TABLE 1. *Results of the waste management understanding test*

Class	N	Minimum	Maximum	Mean
Pretest Control Class	22	45.00	70.00	58.40
Pretest Experimental Class	25	45.00	65.00	54.40
Posttest Control Class	22	60.00	85.00	72.72
Posttest Experimental Class	25	80.00	100.00	89.80

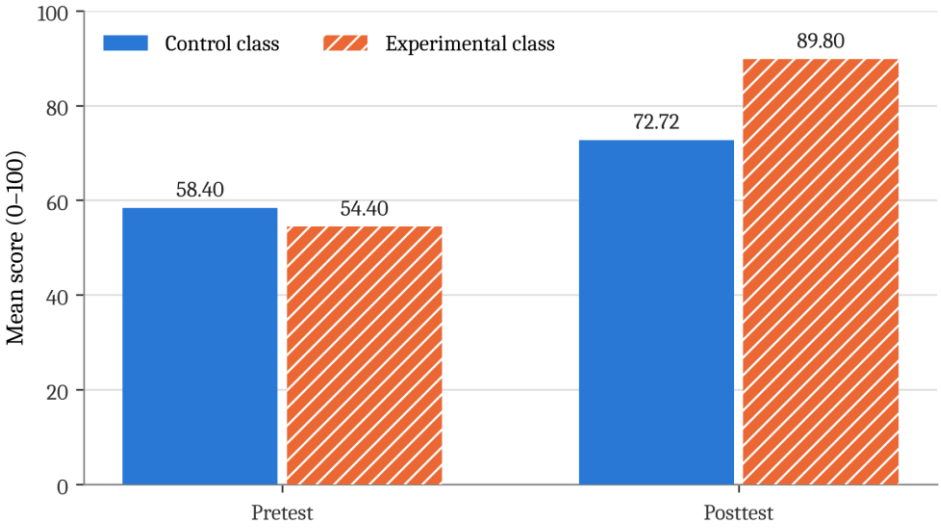


FIGURE 1. *Improvement in waste management understanding test results*

TABLE 2. *Normality test results*

Class	Statistic	df	Sig.	Distribution
Pretest Control Class	0.924	22	0.092	Normal
Pretest Experimental Class	0.913	25	0.035	Normal
Posttest Control Class	0.926	22	0.102	Normal
Posttest Experimental Class	0.911	25	0.032	Normal

The results of the analysis of students' understanding of waste management showed that in the pretest, the control class had a mean score of 58.40, while the experimental class had a mean score of 54.40. Although the control class had a slightly higher initial mean score, the results of the posttest showed that the control class achieved a mean score of 72.72, whereas the experimental class achieved a mean score of 89.80. The control class showed an increase of 14.32 points, while the experimental class showed a greater increase of 35.40 points.

Figure 1 shows that the average results of the waste management understanding test for students in the experimental class are higher than those in the control class. This shows that students' understanding of waste management material after participating in learning using the integrated Acehnese hikayat video series has increased.

Then, an analysis of covariance (ANCOVA) was conducted to determine the effectiveness of the integrated Acehnese hikayat video series on students' understanding of waste management material. The initial step was to carry out a normality test and a homogeneity test as prerequisite tests. The results of the normality test can be seen in Table 2.

Referring to the data presented in Table 2 shows that the pretest of the control class with a significance value of 0.061. Likewise, the results of the pretest of the experimental class have a significance value of 0.200. For the posttest, the control class recorded a significance value of 0.100, while the posttest value of the experimental class has a significance value of 0.089. Based on these data, it shows that overall the data distribution

TABLE 3. *Results of the homogeneity test*

Variable	Levene Statistic	df1	df2	Sig.	Description
Pretest	1.468	1	45	0.232	Homogeneous
Posttest Posttest	1.011	1	45	0.320	Homogeneous

TABLE 4. *ANCOVA results*

Effect	df	*F*	*p*	Partial η^2
Pretest	1	0.575	0.452	.013
Instructional Group	1	63.975	< .001	.592

is categorized as normal. Furthermore, the results of the homogeneity test can be seen in Table 3.

Table 3 presents the results of the homogeneity of variance test using Levene's test. The pretest data obtained a significance value of 0.232, while the posttest data obtained a significance value of 0.320. Since both significance values are greater than 0.05, the variances of the control and experimental groups can be considered homogeneous. Therefore, the homogeneity assumption was satisfied, and the data were subsequently analyzed using analysis of covariance (ANCOVA), with pretest scores entered as a covariate. The results of the ANCOVA are presented in Table 4.

The analysis of covariance (ANCOVA) results presented in Table 4 showed a significant effect of instructional group on students' posttest scores after controlling for pretest scores, $F(1, 44) = 63.975$, $p < .001$. This indicates a significant difference in students' understanding of waste management between the experimental group, which received instruction using a series of Acehnese hikayat videos, and the control group, which received instruction using standard educational videos covering the same material. The effect size was large (partial $\eta^2 = .592$), indicating a substantial effect of the instructional intervention. The pretest score was not a significant covariate, $F(1, 44) = 0.575$, $p = .452$. Overall, these findings suggest that, after controlling for students' initial understanding, the use of the Acehnese hikayat video series under the Merdeka Curriculum was associated with significantly different posttest scores compared with the standard educational videos used in the control group.

DISCUSSION

Building students' understanding of waste management from an early age is important for developing environmental awareness and responsible attitudes toward waste. Environmental education at the elementary school level can help students understand environmental issues, recognize the impacts of improper waste management, and develop appropriate waste management practices. Therefore, effective and contextually relevant environmental education is essential for strengthening students' understanding of waste management and encouraging responsible behavior toward the environment.

One effort that can be made to improve understanding of waste management is to use integrated video learning media with Acehnese hikayat. Through this media, students can be facilitated in understanding and managing waste, as culturally responsive education can enhance the inclusiveness and effectiveness of learning (Arvanitis, 2021). Integrating local cultural elements into learning media can also help prevent cultural erosion by preserving and transmitting indigenous knowledge to younger generations (Hastuti et al., 2022), while simultaneously supporting the development of students' character and values (Sakti et al., 2024). In addition, cultural preservation can protect students from the negative effects of globalization (Kardana et al., 2022).

The integrated Acehnese hikayat video series makes it easier for students to understand waste management because the material in the Acehnese hikayat provides a

context that is relevant to the conditions in the students' environment. This video directs students to be able to recycle waste, sort it, practice composting, and final disposal. Student involvement in waste management can make education more effective and sustainable (Shaherani et al., 2024). This achievement occurs because videos function as effective tools to increase student interest and provide innovative learning experiences (Kusmaryono & Basir, 2024).

Moreover, the integrated Acehnese hikayat video series not only enriches the learning experience, but also improves the overall quality of learning (Huda et al., 2025). By using the integrated Acehnese hikayat video series, students can understand complex concepts through visualization and real examples, making learning more interesting and interactive. In addition, the integrated Acehnese hikayat video series is useful in improving students' language skills (Shafirova & Araújo e Sá, 2024). The integrated Acehnese hikayat video series helps students to have a deeper understanding. The narratives in Acehnese hikayat convey moral messages that encourage students to develop environmental responsibility. Linking the values in the Acehnese hikayat with waste management practices makes students better understand the importance of waste management.

One of the advantages of the integrated Acehnese hikayat video series is that it can facilitate teachers in conveying local wisdom values in managing waste. The integrated Acehnese hikayat video series provides students with the opportunity to learn to manage waste and connect students with relevant material in everyday life. By giving students direct responsibility in waste management, they can learn about the importance of sustainability and the impact of waste on the environment. Through practical projects, students can see the results of their actions and understand the importance of good waste management. This not only builds environmental awareness but also shapes students' character and responsibility. This is in line with Brotosusilo et al. (2022), who argued that direct and practical learning is very important to educate students about environmental issues.

Finally, the Acehnese hikayat video series provides visual representations of waste management processes, allowing students to observe examples of appropriate waste management practices. Such visualization can help elementary school students understand concepts that may otherwise be presented abstractly. The video series can also be accessed repeatedly, providing students with opportunities to review the learning material beyond the classroom. Repeated exposure to the instructional content may support students' understanding and retention of waste management concepts. The videos also provide opportunities for classroom discussion about the environmental impacts of unmanaged waste. However, the present study did not specifically measure students' communication skills, courage to express ideas, collaboration, independent learning, or character development; therefore, the effectiveness of the video series in improving these outcomes cannot be concluded from the present findings.

The experimental group demonstrated a greater improvement in understanding waste management compared to the control group. This improvement can be attributed to the integration of Acehnese hikayat into the instructional videos; these presented waste management concepts through narratives and visual contexts that were culturally familiar, thereby helping students relate the material to their daily experiences. These findings indicate that integrating Acehnese hikayat into instructional videos can support innovative waste management education and provide a valuable reference for implementing waste management content within the Merdeka Curriculum. However, the study had limitations, including a relatively small sample size, a restricted geographical scope, a short intervention duration, and a focus primarily on cognitive understanding. Future research should develop a series of videos integrating Acehnese hikayat for other learning topics to provide a broader range of culturally responsive digital learning resources that cover essential material within the Merdeka Curriculum.

CONCLUSION

The implementation of the integrated Acehnese hikayat video series showed significant results in improving students' understanding of waste management. The results of the student understanding test showed a significant difference between the control class and the experimental class. Overall, the implementation of the integrated Acehnese hikayat video series in learning waste management not only improved students' understanding, but also created a more interactive and relevant learning experience to everyday life. This shows the importance of integrating local culture in education to improve learning effectiveness.

There is a need to expand the video series content to cover other topics and improve the quality of video production, including more interesting animations and narrations. In addition, training for teachers on the development of video learning media and effective ways to use video series in learning is very important to be held. Implementation of evaluations, trials of the application of video series in other schools with different backgrounds can be carried out to evaluate its effectiveness more broadly.

AUTHOR CONTRIBUTIONS

Mahlianurrahman Mahlianurrahman: Conceptualization, Methodology, Formal analysis, Writing – original draft. Muhammad Febri Rafli: Investigation, Resources, Data curation, Visualization. Cut Kumala Sari: Validation, Supervision, Project administration, Writing – review & editing. All authors have read and approved the final version of the manuscript.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was conducted with the permission of the principal of the participating elementary school in Langsa City and was embedded in regular classroom learning activities. Formal review by a research ethics committee was not required for this minimal-risk educational study, as determined by the Faculty of Teacher Training and Education, Universitas Samudra. Written informed consent was obtained from the parents/guardians of all participating students, and the students gave their assent to participate. Student identities were kept confidential, and only anonymised data are reported. Consent for publication of anonymised data was obtained.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request; they are not publicly available because they contain information that could compromise participant privacy.

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DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE MANUSCRIPT PREPARATION PROCESS

During the preparation of this work, the authors did not use any generative AI or AI-assisted technologies.

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