

## Development Of The Game "Pirates Of Nusantara's Sea" Based On The Java Framework As A Medium To Enhance The English Multiliteracy Skills Of 11th-Grade Students At Man 2 Mojokerto

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### Abstract

*Describing the development, quality, and effectiveness of using the web-based game "Pirates of Nusantara's Sea" as a medium to understand English reading materials is the aim of this research. The techniques developed in this study are based on Multiliteracies and New Literacies from The New London Group, considering the characteristics of Gen Z students, who prefer digital platforms as their learning medium. This research utilized R&D development methods with the ADDIE model, as it aims to produce a viable product for literacy learning media. This is evidenced by an average validation score of 86.29% provided by material and graphic design validators. The findings revealed that the average post-test score of students in the experimental class was 82.6, compared to 68.4 in the control class. Furthermore, the learning mastery rate in the experimental class was 91%, whereas the control class achieved a mastery rate of 48%. Student responses or interest in learning English using this game-based medium were categorized as positive, indicating that 11th-grade students at MAN 2 Mojokerto showed enthusiasm for learning English. In conclusion, using web-based game media can effectively enhance the quality of student learning outcomes.*

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**Keywords:** Media, Multiliteracies and New Literacies, Pirates of Nusantara's Sea, Java Web

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### INTRODUCTION

Mastery of foreign languages, particularly English, is now a necessity. In this era of rapid technological and informational development, it demands that we communicate without borders. Understanding and possessing English skills as an international language is a critical key to accessing knowledge, technology, and global business. According to data released by the Florida Language Services website in 2023, English as an international language is spoken by 1.452 billion people across 67 countries worldwide. Zulfania Arrahma, Mutiara, and Alfariy (2022) stated that having English proficiency broadens one's worldview and international knowledge, enhances career opportunities, and improves communication skills.

English has been taught in Indonesia's educational curriculum from elementary school to high school. Ideally, within approximately 12 years of learning, Indonesian students should have a solid mastery of English literacy. However, the reality in the field shows otherwise. English is still considered one of the most challenging and least favored subjects among students. Not only

students but teachers also struggle to teach English effectively, as if the right formula for improving students' English literacy has yet to be discovered.

Data from the EF English Proficiency Index (EF EPI) in 2023 shows that Indonesia's English proficiency is ranked low. According to EF EPI 2023, Indonesia ranks 79th out of 113 countries worldwide (Feed, 2023). Several factors contribute to the low English proficiency of Indonesian students, including inadequate facilities, limited opportunities for practice, ineffective teaching methods, or students' lack of motivation and interest in reading and writing. This situation is concerning, especially considering the government's vision for Indonesia Emas (Golden Indonesia) 2045. Students' low interest in literacy, particularly English literacy, without proper solutions, could result in missed opportunities to access global information and knowledge. Proficiency in English is a critical requirement in the global job market. This aligns with Siregar's (2023) findings, which suggest that businesspeople and employees proficient in English gain advantages, such as easier access to global information and insights into international business phenomena, thereby enhancing their knowledge, confidence, and career prospects.

Research data from PIRLS indicates that the average literacy achievement score for Indonesian students is 405, significantly below the global average of 500. UNESCO in 2022 also reported that Indonesia's literacy interest level is only 0.001, meaning that out of every 1,000 Indonesians, only one is interested in literacy, whether reading or writing. Encouraging students to enjoy English literacy is the teacher's responsibility as the frontline of English education in schools. A worrying trend is that students' low interest in reading English is compounded by the growing use of translation technology, which reduces their motivation to learn English as a foreign language.

21st-century teachers must think swiftly to address the challenges currently faced in Indonesian education. The increasing sophistication of translation technology with features such as artificial intelligence capable of detecting multiple languages and tools like Google Camera's photographic translator has made Gen Z an "instant" generation, further disinclined to engage in literacy activities. Gen Z is unique, born in an era where digitalization is embedded in nearly every aspect of life. Advanced communication devices serve as "saviors," bridging differences in race and language. For Gen Z, gadgets are as essential as food, representing both necessity and passion. Teachers must harness this opportunity to transform gadgets into effective tools for motivating students to actively learn English.

English literacy should be presented in a visually appealing format with strong characters, combining the latest sociocultural literacy theories that expand the traditional concept of literacy by incorporating digital technologies such as images, videos, or engaging sounds. This creates a comprehensive and creative

multiliteracy experience. Literacy should also be sparked by curiosity and joy, often absent in traditional classrooms.

For this reason, this paper titled Development of the Web-Based Game "Pirates of Nusantara's Sea" Using the Java Framework as a Means to Enhance the English Multiliteracy Skills of 11th-Grade Students at MAN 2 Mojokerto integrates sociocultural literacy theories with digital innovations favored by students, such as web-based games. This research aims to explain the development process of the media and its impact on improving students' English literacy learning outcomes.

## LITERATURE REVIEW

### 1. Learning Media

A medium is essential for delivering learning materials to students, and this medium is known as learning media. Learning media are necessary for students to maximize their cognitive knowledge during the learning process (Sari, 2024). Implementing appropriate English learning media helps teachers present materials more easily and engagingly, making the learning process more effective and enjoyable. According to Ponto (2024), all English learning media have their own advantages, but their primary purpose is to assist students in understanding the subject matter. The learning process becomes effective and meaningful when appropriate learning media are used to align with the educational objectives.

### 2. Game Media

Learning media have evolved significantly due to the advancements in modern and sophisticated technology. Common technologies used in learning include LCD projectors, smartphones, and digital games. Currently, students are highly enthusiastic about games; therefore, leveraging this phenomenon, digital games can serve as alternative learning media for students. If the games are web-based, they can be accessed not only in the classroom but also anytime and anywhere.

Several studies suggest that games as learning media have the potential to combine entertainment with educational content that players may not consciously realize. Educational content in games can stimulate students' cognitive knowledge development. Below are some functions of digital games as English learning media:

#### a. Games as Enjoyable Learning Media

Through digital games, learning English becomes easier for students to understand. This is because digital games make the learning process more creative, innovative, and free from boredom or stress. According to

research by Heumos & Kickmeier-Rust (2020), learning media using games reduces students' anxiety.

b. Games as Stimuli for Students' Cognitive Skills

Game-based media positively impact students' cognitive skills. This is supported by the findings of Zeng, Parks, & Shang (2020), which indicate that utilizing games as learning media effectively captures students' attention and motivation. Games involve social interaction, cooperation, or competition with other students in a virtual environment.

c. Games as Facilitators of Linguistic Learning

According to Foster & Shah (2020), games act as facilitators that bridge the interests of teachers and the needs of students. Games also enhance students' engagement in examining or analyzing language through the content and technology within a game. The content in games can help students understand vocabulary, keywords, and information from a text. Technology in online games, whether web-based, Android, or iOS, provides students with the flexibility to learn anytime and anywhere.

### 3. Sociocultural Literacy Theory

Sociocultural Literacy Theory is an approach to literacy studies that emphasizes literacy as a social practice influenced by the cultural, social, and environmental contexts in which individuals live. In this approach, literacy is not merely the individual ability to read and write but a process intricately tied to diverse social practices, shaped by a person's cultural, political, and economic contexts.

## METHOD

### 1. Type of Research

This research aims to produce a product and test its effectiveness, thus employing the Research and Development (R&D) method (Umar, Purwanto, & Al Firdaus, 2023). The development process includes the following stages: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation, commonly abbreviated as ADDIE. These stages align with critical thinking skill indicators, as they involve problem formulation, drawing general conclusions, evaluation, and determining actions. According to research by Spatioti, Kazanidis, & Pange (2022), the ADDIE model is designed for collaborative learning by utilizing mobile devices or virtual reality environments, as it enhances cognitive skills, self-regulation, and effective learning, enabling students to achieve higher levels of knowledge.

## 2. Research Subjects

The subjects of this research are Class XI A1 and Class XI A2. Class XI A1 serves as the control group, while Class XI A2 is the experimental group. Both classes specialize in Science subjects, with English being a core subject allocated the same amount of time (3 periods). It is assumed that both Class XI A1 and A2 have equivalent English literacy skills.

## 3. Methods and Data Collection Tools

This study employs a data collection method by distributing questionnaires to respondents.

### a. Data Collection Tools

The questionnaire or checklist as the data collection instrument is administered in two stages: the first for evaluating product quality and the second for assessing product response from trial results.

### b. Feasibility Assessment Instruments by Media and Material Experts

This instrument is designed to evaluate the feasibility of the developed learning media.

### c. Response Instrument for Users

Students of Class XI A1 and A2 at MAN 2 Mojokerto are tasked with completing the questionnaire instrument during the English learning process. The questionnaire contains six statements that the students need to respond to.

## 4. Validation Test

In this test, the researcher seeks assistance from competent experts in their respective fields, referred to as validators, to obtain constructive criticism and suggestions (Hikma, 2024). This research involves two (2) validators or experts:

**Content or Material Validator:** Validates the content and material in the developed media. The validator is a competent high school/MA English teacher.

**Graphic Design Validator:** Validates the media's design. The validator is a computer programming expert.

## 5. Data Analysis Techniques

Several stages are involved in analyzing the data from the development of the web-based game media, starting from the definition stage to the development stage. The game is analyzed using qualitative descriptive techniques, as are the teachers' responses and students' feedback after using the application. Meanwhile, data from validators are analyzed using quantitative descriptive techniques, and students' activities are analyzed during the media usage.

## RESULT AND DISCUSSION

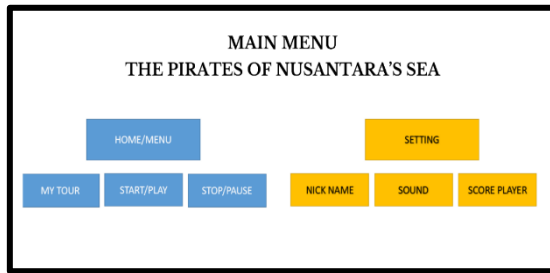
### 1. Description of the Product Development Process

The result of this development is an English literacy media in the form of a web-based game named "The Pirates of Nusantara's Sea". The game contains several text types, including Descriptive, Narrative Texts, and Literature Appreciation. In addition to being an educational game, "The Pirates of Nusantara's Sea" aims to foster students' patriotism through gameplay set in the waters of the Nusantara archipelago. Below is an explanation of how to use the "The Pirates of Nusantara's Sea" game developed in this research:

- a. To play the game, open a browser and enter the game URL. Any browser can be used, including Google Chrome, Mozilla Firefox, Opera, etc. The game can also be accessed on mobile phones using the default browser on the device.
- b. Click on the "Setting" menu and fill in the player's nickname. You can also choose to turn the background music on or off. Then, click the "Back" button to return to the main menu, which displays three main buttons: Tour, Start/Play, and Stop/Pause.
- c. Click "Home". If you want a tutorial, select "Tour", and an explanation of how to play the game will appear. Once you understand, click "Back", and the "Home" menu will reappear. Click "Play Game" to start the game.
- d. Players will encounter a pirate ship from the 1700s sailing across Indonesian waters. The map of the Indonesian archipelago will also appear, and clicking on an island will reveal literacy texts themed around that island (e.g., culture, history, unique features, etc.).
- e. Read the provided texts and answer the questions. Each question will include three (3) answer clues. Click the answer you believe is correct. If the answer is correct, you will earn hidden "treasures" and can continue sailing to discover more hidden questions on other islands.
- f. If your answer is incorrect, the ship will sink, and the game will end (Game Over).
- g. The player with the highest score wins the game.
- h. The game is designed to be played simultaneously by all students in the class.

### 2. Intro Menu or Landing Page Display

As a result of the development process, changes were made to the initial design of the intro menu. In the initial design, a "Menu" icon was included. However, after further development, the intro menu was removed to improve efficiency. The change allows the menu icons to appear automatically without requiring any clicks. The design change is shown in Figure 4.1 below.



*Figure 4.1, Initial Design*

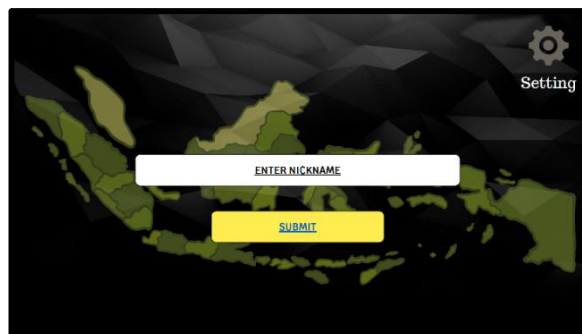


*Figure 4.2, 1st Development*



*Figure 4.3, 2nd Development*

On this landing page there is a “New Game” button, when this button is clicked the player will be taken to the “Setting Page”. On this page, players can fill in their Nick name, when finished they can send their name so that it can be stored in the data base by clicking the “submit” button below it.



*Figure 4.4, Setting Page*

### 3. Main Menu Design

In the initial design in the blue print, after the landing page is directly the text menu or questions, in its development there are minor changes. The “My Tour” button and a row of questions are removed so that an explanation of the game (My Tour) automatically appears and the player is shown a map of the Indonesian archipelago.

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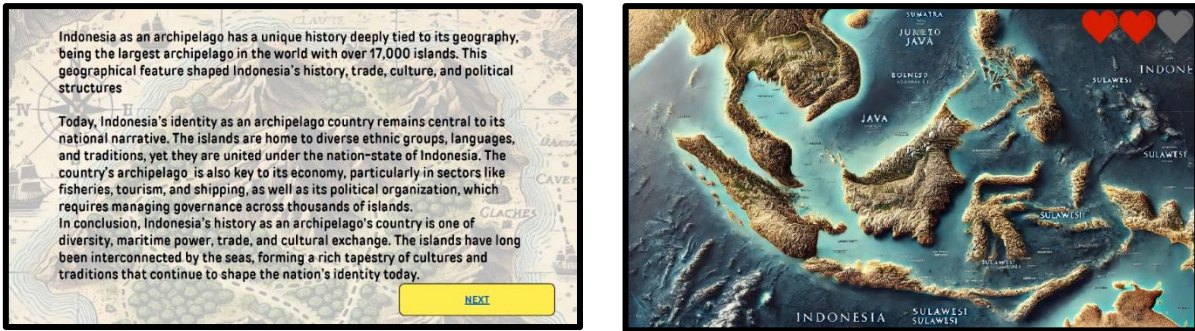


Figure 4.5, "My Tour" and Indonesian Archipelago page

## 4. Literacy Problem Design

For Literacy questions given are questions according to the scene in Indonesia, for example, if the island of Sumatra is selected, then what will appear is a text related to the island of Sumatra.

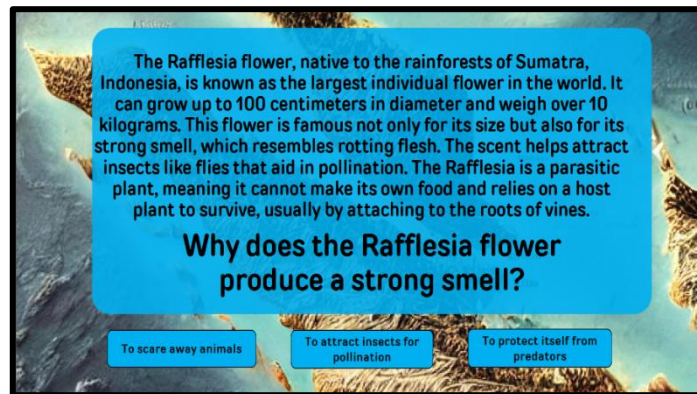


Figure 4.6, English Description Text about Raflesia Flower which is the Icon of Sumatra Island

At the end of the problem, the player is given a multiple choice question with three answer choices. If the player answers correctly, the player will get the "Treasure" from the island of Sumatra along with the points earned. Each island has a different score/point. The more complex the Literacy text, the higher the points that will be obtained.

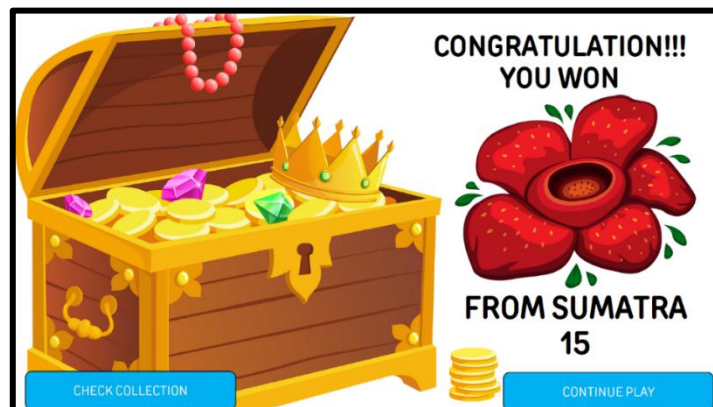


Figure 4.7, "Treasure" in the form of valuable objects from certain regions and points that players get if the answer is correct.

If the player answers correctly, they will receive "Treasures" in the form of:

- a. Iconic Items from the Selected Region or Island  
 These items will be collected as part of the player's score. Players will accumulate a collection of various emblems/icons from the islands they have successfully explored.
- b. Points/Score  
 The points or score awarded depend on the complexity of the text solved. The more complex the text, the higher the score obtained.

The following is a collection of emblems/icons that players can get:



Figure 4.8, Emblem/Icon that the player gets if the answer is correct

If the player's answer is wrong, then the player will get the icon of the "Pirates" ship sinking and a crying Pirate emoticon and the game is immediately "Game Over", as below.



Figure 4.9, Emblem/Icon that the player gets if the answer is wrong

## 5. Product Development Quality

The following are the results of expert validation and student responses:

### A. Expert Validation Results

This validation test was conducted to determine the feasibility of the product by involving a subject matter expert and a media expert. In this study, two experts were involved: one senior English teacher as the subject matter expert and one computer programmer as the media expert. The validation results from these two

experts included evaluations, suggestions, and improvements to further develop the product. After revisions, the product was tested on users, namely students.

a) Validation Results

The subject matter validation was conducted by a senior English teacher, while the media validation was performed by a computer programmer. The purpose of subject matter validation was to assess the feasibility of the content in the educational media. The validation results are presented in Appendix Table 1.

**Table 1. Validation Results for Media Feasibility Assessment**

No	English Media Criteria	Validator Assessment	
		Validation Team	Interpretation Criteria
1.	Content Feasibility	86.80 %	Very good/very good
2.	Graphic Design Feasibility	85.77 %	Good/viable
Average Score		86.29 %	Good/viable

From the validation assessment table, the learning media is good and feasible to use, indicated by the average score of 86.29%.

B. Student Responses

The researcher used a questionnaire to gather student responses. The questionnaire was filled out by students in classes XI A1 and A2. The total percentage of student responses was 75.82%. This result was then transformed into a student response category, which falls under the positive category. It can be concluded that students showed interest in the developed learning media.

**6. Analysis of Class Learning Completeness**

The results of processing the post-test scores for the experimental and control classes using SPSS 20.0 are as follows:

**Table 2. Statistic Group**

	CLASS	N	MEAN	Std. Deviation	Std. Error Mean
Post Test Results Literacy	CLASS XI A1	36	69,7941	6,69138	1,14756
	CLASS XI A2	36	79,2647	6,29241	1,07914

The table shows that the average of the control class (XI A1) is 69.79. Furthermore, the average of the experimental class (XI A2) is 79.26. It can be concluded from both data that the average of XI A2 class that used the media game "The Pirates of Nusantara's Sea" was higher than XI A1 class that did not use any media and read the text directly from the book repeatedly without any stimulus of pictures or other media.

Meanwhile, in this study, the descriptive model with learning guide was used in the experimental and control classes to test the impact of using "The Pirates of Nusantara's Sea" Game media as follows:

$$(62,7) \quad \text{XI A2 (O1)} \quad X \quad \text{XI A2 (79,6) (O2)}$$

(66,3 ) XI A1 (O3)

XI A1 (69,7) (O4)

Keterangan:

O1 dan O3 : Pretest

O2 dan O4 : Pretest

X : Treatment in the form of media application

The results of the calculation obtained the average value of Pretest class XI A2 is 62.7 and class XI A1 is 66.3. For the average post-test value of the experimental class (XI A2) is 79.6 and the control class (XI A1) is 69.7.

Based on data processing, it can be seen that class XI A2 by utilizing the Game media “The Pirates of Nusantara’s Sea” in the learning process experienced an increase in the average value of learning completeness greater than class XI A1 which did not use the learning media and only used conventional methods by reading text in books without any stimulus. MAN 2 Mojokerto has a standard Minimum Completion Criteria (KKM) for English class XI which is 75.

Table 3 shows the calculation of the percentage of post test classical learning completeness of the Literacy theme of the experimental class (XI A2) and the control class (XI A1).

Table 3. Percentage of Completion of Learning Outcomes (POSTES)

PERCENTAGE OF COMPLETENESS XI A1	PERCENTAGE OF COMPLETENESS XI A2
$KK = \frac{\text{Number of students who completed}}{\text{total number of students}} \times 100\%$ $KK = \frac{15}{36} \times 100\%$ $KK = 41\%$	$KK = \frac{\text{Number of students who completed}}{\text{total number of students}} \times 100\%$ $KK = \frac{28}{36} \times 100\%$ $KK = 77\%$

From the table above, it is known that class XI A2 when learning using media development products produces completeness of learning outcomes of 77%, compared to class XI A1 which does not use media, learning completeness is only 41%. When compared with the initial conditions of learning, it can be described by the following graph.

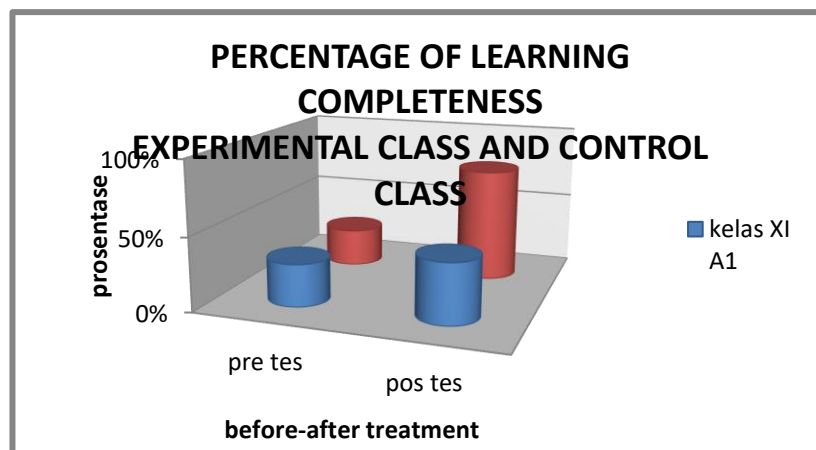


Figure 4.10 Percentage of Student Learning Completeness Using Game Media  
Contents of Discussion Results

It can be concluded that the use of the game media "The Pirates of Nusantara's Sea" for understanding English Literacy form questions, is very significant in improving student learning outcomes. Based on the data obtained, it can be seen that the average post-test value of the experimental class is 79.6 and the control class is 69.7. Meanwhile, based on the percentage of completeness of learning outcomes, class XI A1 only 41% of students are complete, while class XI A2 which uses the Game media "The Pirates of Nusantara's Sea" reaches 77% of students' grades are complete. So the media game "The Pirates of Nusantara's Sea" is very well used for English Literacy learning media by applying Multiliteracy theory.

## CONCLUSION

Conclusion on the Development of the Game "Pirates" of Nusantara's Sea Based on Java Framework as a Way to Improve English Multiliteracy Skills of Class XI Students at MAN 2 Mojokerto. The development process of the media in this study used the ADDIE model, consisting of (1) analysis, (2) design, (3) development & implementation, (4) evaluation.

Conclusion on the Quality of the Game "Pirates" of Nusantara's Sea Based on Java Framework as a Way to Improve English Multiliteracy Skills of Class XI Students at MAN 2 Mojokerto. Based on the analysis and assessment from the validation team, the web-based game "Pirates" of Nusantara's Sea is suitable for limited trials. This is demonstrated by the average validation score from the content and graphic validators, which gave an average score of 86.29%, categorized as good. Effectiveness of the Game "Pirates" of Nusantara's Sea Based on Java Framework as a Way to Improve English Multiliteracy Skills of Class XI Students at MAN 2 Mojokerto

Based on student responses and results, it can be concluded that the implementation of this game media is engaging for students and effective in improving their English skills. This is shown by the positive responses from the student questionnaire analysis and the learning completion rate in class XI A2, which demonstrated good results and exceeded the KKM standards at MAN 2 Mojokerto.

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