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ADVANCES IN SOCIAL HUMANITIES RESEARCH

Development of Escape Room Game-Based Interactive Learning Media to Improve Grade 3 Students' Understanding of Environmental Materials

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Abstract:

This study aims to develop and test the effectiveness of escape room-based interactive learning media in improving the understanding of 3rd grade elementary school students of environmental materials. The background of this development is that there is still a low interest in learning and students' understanding of environmental materials due to conventional learning methods that are less attractive. The research method used is Research and Development (R&D) with the ADDIE development model, which includes the stages of analysis, design, development, implementation, and evaluation. Validation was carried out by material experts and media experts, with results showing feasibility rates of 91.6% and 90%. The practicality test showed that this medium was very practical, with a score of 97% from teachers and 94% from students. The results of the effectiveness test also showed that this medium was very effective, with a completeness rate of 93.33% in the limited test and 93.21% in the broad test. This learning medium not only increases students' motivation to learn, but also encourages active participation, critical thinking, and cooperation in groups. Thus, the use of escape room media in learning makes a significant contribution to improving the quality of learning environmental materials in elementary schools.

Keywords: *interactive learning; escape room; educational media; elementary school students; environmental materials; Learning Motivation*

INTRODUCTION

In today's digital era, the use of technology in education is increasing. One of the innovations that can improve students' understanding of subject matter is the use of interactive learning media. Elementary school students, especially 3rd grade elementary school, need learning media that can spark their interest in learning and encourage active engagement in the learning process (Bulkani et al., 2022; Puspitarini & Hanif, 2019; Rachmadtullah et al., 2023; Rukayah et al., 2022; Taufik et al., 2022). The ideal conditions expected in the learning process are when students can learn actively, engage directly, and gain a deep understanding of the material being taught.

According to Dewi's (2021) research, interactive game-based learning media is able to increase student learning motivation because it provides a fun and challenging learning atmosphere. However, in the context of learning for grade 3 elementary school students, the application of this media is still relatively rare due to the limited readiness of teachers to adopt technology, the lack of availability of supporting infrastructure, and the lack of understanding of how to effectively integrate interactive media into the curriculum. Therefore, its effectiveness still needs to be further researched. The active

learning theory developed by Mayer (2020) asserts that students learn better when they actively participate in learning, especially if the medium used allows them to think critically and solve problems independently.

However, many 3rd-grade elementary school students still have difficulty understanding environmental materials. This is due to the traditional learning approach that is monotonous and does not actively engage students. According to Setyawan (2020), existing learning media are often unable to attract students, especially at the elementary school level. This is a challenge for teachers in conveying basic environmental concepts effectively.

Based on the results of observations at *SD Negeri 1 Wates*, the teaching methods used are still dominated by lecture approaches and written methods. This is in line with the findings of research by Wibowo (2021), which shows that 75% of primary school teachers still rely on conventional methods due to the limitations of training in the use of interactive media and the lack of implementation guidance in the national curriculum. As a result, students' active participation in learning becomes limited, especially in understanding environmental materials that require a contextual approach. Interviews with 3rd grade *hometeachers* also revealed that many students had difficulty understanding the concept of the environment due to the lack of varied teaching methods. In addition, the documentation of learning outcomes shows that an average of 20 out of 30 students have difficulty understanding the basic elements of the environment such as living things, ecosystems, and the role of humans in maintaining the balance of nature. Common mistakes found include the inability to distinguish between artificial and natural elements and a lack of understanding of interactions in ecosystems.

To overcome this problem, the proposed solution is the development of *escape room*-based interactive learning media. *Escape room* is a game concept where participants have to work together in teams to solve various puzzles in a certain amount of time to achieve a specific goal. In the context of environmental learning, *escape rooms* can be applied by presenting scenarios that distinguish between the natural environment and the artificial environment and illustrate real environmental problems, such as river pollution or forest destruction. Students are required to solve scientific fact-based puzzles, such as identifying the causes of pollution, finding sustainability solutions, or understanding ecosystem cycles, before being able to move on to the next stage in the game. With this approach, students not only get a pleasant learning experience, but also understand the concept of the environment in a more in-depth and contextual way. In the world of education, this concept can be applied as an interactive learning medium that presents challenges and puzzles related to the subject matter (Brown et al., 2019; Buchner et al., 2022; Piernas et al., 2024; van Houwelingen et al., 2023; Yllana-Prieto et al., 2021). This media not only attracts students' attention, but also motivates them to think critically, solve problems, and work together in groups (Hakim & Windayana, 2016; Mahardika et al., 2022; Pamungkas et al., 2021; Purwati, 2021; Rhamdan et al., 2020). Previous research has shown that the use of *escape rooms* in learning can improve students' understanding because they are actively involved in the learning process.

The use of *escape room*-based learning media has several main advantages. First, this media can make learning more interesting and fun, thereby increasing students' motivation to learn. Second, *escape rooms* give students the opportunity to think critically in solving puzzles, which helps them develop critical thinking skills from an early age. Third, it encourages cooperation in groups, teaching students the importance of sharing ideas and respecting the opinions of others. In addition, *escape rooms* allow students to experience challenge-based learning that encourages in-depth and contextual exploration of concepts.

Based on the problems that have been identified and various previous studies, this research has a novelty in the use of *escape room*-based learning media for grade 3 elementary school students. Although research on interactive multimedia has been carried out extensively, *escape room*-based approaches are still rarely applied in the learning of environmental materials at the elementary school level. Therefore, this study aims to develop and test the effectiveness of *escape room*-based interactive learning media in improving students' understanding of environmental materials.

It is hoped that this research can provide a more interesting and interactive alternative learning media and help students understand the concept of the environment better. According to Aulia and Rahman (2021), *escape room*-based learning allows students to interact directly with the material through fun puzzles. In this study, grade 3 elementary school students who participated in learning with this approach showed better understanding compared to conventional learning methods. Thus, the development of *escape room*-based learning media has great potential in improving the quality of learning in elementary schools. The implementation of this media can be done through several concrete steps, such as designing scenarios based on real environmental problems, developing interactive puzzles that test students' understanding, and integrating digital or physical media that support challenge-based learning experiences. With this approach, students not only understand environmental concepts more deeply and contextually but also engage in a fun and collaborative learning experience.

METHOD

In this study, *Research and Development* (*R&D*) methods were used. This study used the *ADDIE* development model to develop a learning design. The *ADDIE* model has several stages consisting of analysis, design, development, implementation, and evaluation, and these will be carried out sequentially to produce a product that is used as an alternative to solving the identified problem. This research was conducted at *SDN 1 Wates Kediri*, with the research subjects being grade 3 students, totaling 30 students.

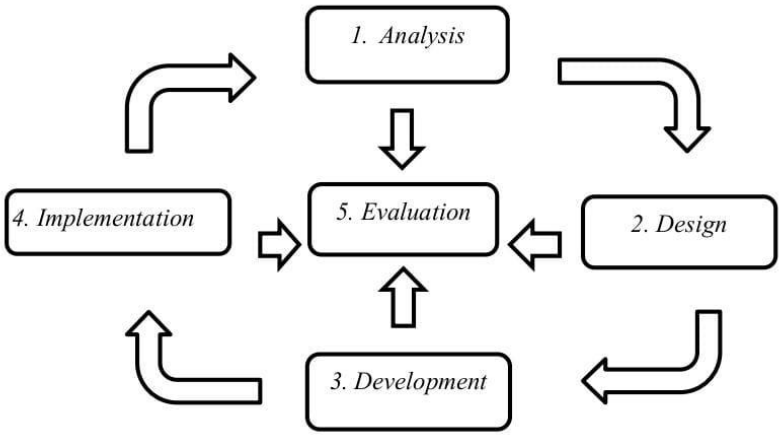

Figure 1. ADDIE Model
Source: Benny A. Pibadi (2009:127)

The data collected in this study is divided into three interrelated types: data on the validity, practicality, and effectiveness of the developed learning media. First, product flaw data will be obtained through expert assessment. Subject matter experts will assess the content and suitability of the material to the environment being taught, while media experts will assess the design. After assessing the flaws of the product, the media will also be tested in terms of practicality. The results of user assessments teachers and students who will use the media in the learning process will determine the practicality of this product. Teachers will provide feedback on how easy it is to use the media and how engaged students are, while students will rate how easy it is to use.

To obtain the three types of data mentioned in this study, several specially designed instruments were used. The first instrument is a validation sheet that aims to assess the validity of the product. This validity is assessed through a validation sheet by material experts and media experts, which ensures that the content of the material and media design are in accordance with the needs of grade 3 students on environmental materials. Furthermore, to measure the practicality of using this *escape room*-based interactive learning media, a practicality assessment sheet was used, filled out by teachers and students. Assessments from teachers provide insights into the ease of implementation in the learning process, while student assessments highlight practicality aspects from an end-user perspective. The last instrument used to assess the effectiveness of the media was the learning outcome test questions. These questions are designed to measure students' understanding of environmental materials after using this *escape room*-based learning media, so that it can be determined to what extent this product is effective in improving student understanding. The description of the data and instruments that will be used in this study can be seen in the following table.

Table 1. Data, Types of Instruments and Respondents in the Study

Purpose	Measured Aspects	Instruments	Respond
Interactive multimedia product eligibility	Need assessment	Observation guidelines, interview guidelines and document analysis	Teachers and students
	Product validity	Subject matter expert validation sheet and media expert validation sheet	Material experts and media members
	Product practicality	Teacher response questionnaire	Teacher
		Student response questionnaire	Student
	Product effectiveness	Learning outcomes test	Student

Data collection was carried out at SDN Burengan 4, with all 1st grade students as a sample consisting of 30 students.

RESULTS AND DISCUSSION

This research uses the ADDIE development model which includes five main steps, namely *Analysis*, Design, Development, Implementation, and Evaluation. The explanation of each stage is as follows.

Analysis

The first stage in the ADDIE model is analysis, which involves two main approaches namely, the analysis of learning needs and characteristics of grade 3 students to understand environmental material. Based on the needs analysis, it was found that text-only learning was less effective in attracting students' attention. This causes students' motivation to decrease, and their average scores in sentence structure material do not reach the Minimum Completeness Criteria (KKM).

In addition, the analysis of student characteristics in observations and interviews showed that grade 3 students had high curiosity, limited focus ability, and were more interested in activities involving games, interesting visuals, and simple challenges.

Therefore, learning media must be adapted to their cognitive, motor, and social-emotional development. Based on these findings, the development of escape room-based media is the right choice because it is able to combine learning and play elements through interesting challenges, thereby creating an interactive, fun learning atmosphere, and supporting students' understanding of environmental materials. Therefore, learning media must be designed to suit their cognitive, motor, and social-emotional development.

Research supports the importance of innovative learning media. As stated by Hakim and Windayana (2016), the use of interactive media has been proven to be able to increase students' understanding and retention of subject matter. Attractively designed and accessible media also plays a role in increasing students' motivation to learn by creating an inclusive learning environment and encouraging active participation. Therefore, it is

necessary to develop more innovative and interactive learning media to improve student learning outcomes.

Design

At this stage, which is referred to as media design, the form of media to be made is designed as best as possible by considering various factors, such as materials, color combinations, shapes, and so on. The media contains developer profile buttons, instructions for use, identity of IP materials, KD, learning materials, and quizzes, along with images, sounds, and internet content. The results of the field study showed that the Escape Room, an interactive learning medium, was created for second-graders. It has materials and pictures about the environment, educational quizzes, and light music to boost students' enthusiasm for learning.

Development

At this stage of development, interactive media will be used as a learning tool. Both material experts and media experts validate this interactive media. The suggestions, comments, and inputs generated during the validation process can be used as a basis for analyzing and revising the media that has been developed. Errors in interactive media such as content, language, and presentation are avoided with editing. According to Yuliana & Sugiyono (2017), the learning media created can be considered quality if it meets three evaluation standards: valid, practical, and effective. The product will be tested for validity, practicality, and effectiveness. New products can be assessed by looking at the product's validity level. Data on product validity comes from validation by media experts and subject matter experts. The results of media validation are as follows:

Table 2. Media Expert Validation Results

No	Aspects	Question Item	Score Obtained	Maximum Score	Percentage
1	Media Display	2	10	10	100%
2	Effectiveness	2	8	10	80%
3	Efficiency	2	8	10	80%
4	Media Practicality	2	10	10	100%
Total		8	37	40	90%
Criteria					**Highly Worth It**

Based on the results of the validation of media experts, the media display obtained a score of 100%, 80% effectiveness, 80% efficiency, and 100% media practicality. The total score is 90%, which shows that this component is very feasible. This shows that interactive multimedia learning media has an extraordinary appearance, effectiveness, efficiency, and practicality to support education. In addition to assessing media validation, evaluating product validity also involves validating learning materials. The following is the validation of the material experts that will be presented in the tabeli below:

Table 3. Results of Validation of Material Experts

No	Aspects	Question Item	Score Obtained	Maximum Score	Percentage
1	Material Completeness Components	4	17	20	85%
2	Truth of the Concept	3	15	15	100%
3	Material Presentation Components	3	13	15	86,6%
4	Components of Conformity with Basic Competencies	2	10	10	100%
Total		12	55	60	91,6%
Criteria					**Highly Valid**

Based on the results of the validation of material experts, the material completeness component obtained a score of 85%, 100% concept correctness, 86.6% material presentation, and 100% suitability with basic competencies. The total score obtained was 91.6%, which belongs to the very valid category. These results show that the material in interactive multimedia meets the standards of completeness, correctness, presentation, and conformity to the basic competencies required in learning. Based on the description above, it can be concluded that the results of the assessment from the material expert show a validation score of 91.6%, which is included in the very valid category and this media is declared ready to be used without the need for revision.

1. Implementation

   In *the ADDIE* model, the implementation stage is when users, such as students and teachers, start using interactive media that has been developed in the learning environment. At this stage, GELORA's interactive media is applied in the classroom to evaluate students' responses and how they help learning. This stage is carried out to see the practicality and effectiveness of the developed media.

2. Practicality

   The practicality test was carried out using a response questionnaire, which was filled out by teachers and students. The results of the questionnaire given to teachers can be seen in the following table:

Table 4. Results of the Teacher Response Questionnaire

No	Aspects	Question Item	Score Obtained	Maximum Score	Presentase
1	Media Usability Components	4	20	20	100%
2	Components of Material Suitability with Learning	4	15	15	100%
3	Components of Eligibility for Use	3	14	15	93%
	Total	11	49	50	97%
		Criteria			**Highly Valid**

Based on the description above, it can be concluded that the response results from the teacher showed a score of 97%, which indicates that GELORA interactive multimedia is considered very practical to be used in learning. In addition to the teacher's response questionnaire, the practicality of interactive multimedia is also measured through the response questionnaire given to students. The results of the student response questionnaire can be seen in the following table:

Table 5. Student Response Survey Results

No	Question	Information				
		1	2	3	4	5
1	Is multimedia learning interesting?					V
2	Is multimedia learning new to you?					V
3	Is multimedia learning presented systematically and clearly?					V
4	Is learning using multimedia fun?					V
5	Is learning with multimedia, materials about the Environment easy to understand?					V
6	Will I be able to work on the existing problems after using multimedia?				V	
7	Can you name examples of the Natural Environment, the Artificial Environment and how to take care of it?				V	
8	Is the language used in multimedia easy to understand?					V
9	What are the images and colors used in interactive multimedia that catch your attention?				V	
10	Do you feel more motivated to participate in learning activities when using multimedia?					V
Total score		-	-	-	12	35
Total score		47				
Presentase		94%				
Criteria		Very Practical				

Based on the description above, it can be concluded that the results of the students' responses to the limited trial showed a score of 94%, which indicates that this interactive multimedia falls into the category of very practical to use.

Effectiveness

In addition to assessing the practicality of the product, to measure the effectiveness of interactive multimedia, test instruments are also needed that function to evaluate student learning outcomes. The results of the effectiveness test from the limited test can be seen in the following data:

Table 6. Results of the Post Test Limited and Extensive Test

Test results	Total	Percentage
Limited Test Results	840	93,33%
Wide Test Results	2.610	93,21%

Based on the data from the results of the GELORA interactive multimedia effectiveness test through evaluation questions (Post Test), the cumulative results of all subjects showed that the limited trial obtained a score of 93.33%, which means that this media is considered very effective and has achieved completion in the material taught. Furthermore, the results of the effectiveness test from the extensive trial can be seen in the following data:

Based on the data from the results of the GELORA interactive multimedia effectiveness test through evaluation questions (Post Test), the cumulative results of all subjects showed that the extensive trial obtained a score of 93.21%, which shows that this media is very effective and has achieved completeness in the IPAS learning material, especially on the topic of Environment.

Evaluation

The last stage in development is evaluation, which aims to assess the results of the learning products that have been created. Once the media has been tested and validated by subject matter experts and media experts, the next step is to review if there are any flaws in the product. If defects are found, the product will be corrected according to the suggestions of the validators. That way, learning media will meet feasibility standards and be ready to be used in teaching and learning activities.

To develop learning media, this study uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model with an escape room approach to help grade 3 students understand environmental materials. From the results of the analysis, it was found that text-based learning is less attractive to students, resulting in low motivation and the achievement of the Minimum Completeness Criteria (KKM). Since students are more interested in simple game activities and challenges, the escape room media is chosen as a solution that can make learning more interesting and interactive. This medium provides a more enjoyable learning experience and can increase student motivation. Previous research has shown that interactive media is able to increase students' active participation and learning outcomes.

In the design stage, the escape room media is developed by paying attention to visual elements, sounds, and educational quizzes that support environmental materials. This design is made to suit the needs and characteristics of students. Previous studies have shown that media that are engaging and relevant to the learning context can increase student learning effectiveness. Once designed, this media is then validated by material experts and media experts.

The validation results showed that this media was feasible for use in learning with a feasibility score of 90% on the technical aspect and 91.6% on the material aspect. These

results are in line with research that emphasizes the importance of product validation before it is widely used.

At the implementation stage, this media is tested in the classroom to measure its practicality and effectiveness. The questionnaire given to teachers showed a score of 97%, which means that this medium is very practical to use. Meanwhile, the questionnaire from the students showed a score of 94%, which shows that this medium can create an interesting and enjoyable learning experience. The post-test results showed high effectiveness, with a score of 93.33% in the limited test and 93.21% in the broad test, which confirms that this media is able to improve students' understanding of environmental materials. These results are also supported by research showing that interactive media can significantly improve student learning outcomes.

At the evaluation stage, the trial showed that this escape room media was very practical and effective in learning. This evaluation ensures that the developed media meets the eligibility standards and can be widely used in learning activities. Overall, this study shows that escape room-based interactive learning media can increase students' motivation and understanding of environmental materials. In addition, research confirms that careful evaluation of learning media can increase its effectiveness and sustainability in the world of education.

The results of implementation and trials show that escape room-based learning media has great potential to be applied in the learning process in elementary schools. For teachers, this media can be an alternative in overcoming students' low interest in abstract materials, such as the environment. With this method, teachers can make learning more interactive and fun, as well as engage students in challenges that stimulate critical thinking and cooperation. The use of escape rooms also allows teachers to apply problem-based and collaborative learning approaches, which can improve students' critical thinking and communication skills.

Although the study showed positive results, some obstacles were still found during the trial. One of the main challenges is how students understand the flow of the game and the challenges it is given. Some students need more time to adapt to the escape room mechanism, so in the early stages of implementation more intensive guidance from teachers is needed. To overcome this, in the future companion modules or tutorials can be created to help students understand how media works before they start playing independently. In addition, differences in academic abilities between students are also a challenge, where students who understand concepts faster can solve challenges first, while other students need more time and guidance. Therefore, a more flexible learning strategy needs to be implemented so that all students have an optimal learning experience. Regarding the limitations of the research, the scope of the sample is still limited to one specific school. Although the results show the effectiveness of media in improving student understanding, further studies with a wider scope are needed so that the results can be generalized to various learning environments. In addition, the evaluation of the effectiveness of the media still relies on direct observation. For further research,

additional evaluation methods such as in-depth interviews or analysis of student learning behavior can be used to gain a more comprehensive understanding.

More broadly, this research provides benefits for various parties in the world of education. Teachers can use escape room-based media as a more interesting and effective learning innovation. For learning media developers, this research can be a reference in creating appropriate educational technology for elementary school students. In addition, for education policymakers, the results of this research can be the basis for developing policies that support the integration of interactive technology in learning in elementary schools. Thus, this research not only benefits students and teachers directly, but also contributes to the development of a more adaptive and innovative education system

CONCLUSION

This research successfully developed and tested the effectiveness of *escape room*-based interactive learning media using the *ADDIE* (Analysis, Design, Development, Implementation, Evaluation) development model, aimed at improving third-grade students' understanding of environmental materials. The validation results demonstrated high suitability and feasibility, with validity levels of 90% for the media and 91.6% for the material. Practicality tests showed the media was very practical, receiving positive responses from both teachers (97%) and students (94%). Effectiveness tests indicated that the media significantly improved students' understanding, achieving completeness rates of 93.33% in limited trials and 93.21% in broader trials. The use of *escape room*-based media provided an interactive, enjoyable, and challenging learning experience, which increased students' motivation to learn. These findings highlight the potential of interactive, technology-based learning innovations to enhance the quality of education, particularly in teaching basic environmental concepts at the elementary level. For future research, it is suggested to explore the long-term impact of *escape room*-based learning media on students' critical thinking and collaboration skills across different subjects and grade levels.

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